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ABSTRACT

This two-volume document reports on a study of globalization and Australia's training market. Volume 1 begins by examining debate on globalization and industry training in Australia. Discussed next is the study methodology, which involved field studies of the metals and engineering industry in South West Sydney and the Hunter and the information technology industry in South West Sydney and the Central Coast of New South Wales. Presented next are major findings regarding the following issues: (1) labor market settings; (2) key challenges confronting both industries studied; (3) why emerging industry training markets are failing to meet the key challenges arising from globalization; and (4) implementation of competencies, the New Apprenticeships, and the training packages. Volume 1 includes 16 tables/figures and a 35-item bibliography. An appendix constituting approximately 60% of Volume 1 contains seven regional industry training market case studies. Volume 2 (also provided on disk) contains technical notes on the following topics: (1) debates associated with the terms "training markets" and "VET institutional arrangements"; (2) empirical data associated in the structure of Australian industry; and (3) data on the size and structure of Australia's metals and engineering and information technology industries and trends characterizing them. Concluding Volume 2 is a 152-item bibliography. (MN)

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Making the grade?

Globalisation and the training market in Australia

Volumes 1 & 2

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Globalisation and the training market in Australia

Volume 1

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Foreword

This project was sponsored by the National Centre for Vocational Education Research (NCVER). The understanding of Hugh Guthrie and Jennifer Gibb demonstrated in overseeing the project from NCVER's end was greatly appreciated.

The research for this project was undertaken by the Australian Centre for Industrial Relations Research and Training (ACIRRT) at the University of Sydney. Project fieldwork was undertaken by Tanya Bretherton, John Buchanan, Richard Hall and Kristin van Barneveld. Shannon O'Keeffe and Richard Pickersgill assisted with the desk-based research at various stages of the project. The final version of the report was checked, proof-read and prepared by Merilyn Bryce and Shiralee Birnbacher. While I was responsible for overseeing the project at ACIRRT, Richard Hall had prime carriage of the project from the fieldwork stage until completion.

Over 50 semi-structured interviews were held with employers, educators and officials involved with the metal and information technology industries. In addition the preliminary conclusions arising from the study were tested out on a meeting with the Manufacturing, Engineering and Related Services Industry Training Advisory Board (MERS ITAB). This meeting had all the national representatives as well as all the State directors of the ITAB. All potential respondents approached agreed to be interviewed and were generous with their time. We wish to acknowledge the support provided by all these people without in any way implicating them in the findings arising from the study.

A synthesis report integrating the findings and drawing out the key implications of the research makes up this volume. Details of the findings arising from the regional, industry case studies of the training market in action are reported in the appendix to volume 1.

A preliminary report was prepared and sent to the NCVER in 1998. The comments provided by two anonymous referees were very useful and assisted with planning fieldwork priorities and improving volume 2, which can be found on disk at the back of this report. Statistical material and the findings of other desk-based research have been consolidated in a series of technical notes in volume 2.

John Buchanan
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Executive summary

Aim of study

Current conventional wisdom holds that the forces of globalisation are profoundly reshaping the nature of economic life in general and working life in particular. It is often asserted that institutional arrangements which may have worked in a previous age are no longer workable today. Furthermore, it is generally assumed that change, in particular the greater reliance now placed on market mechanisms, is required to meet the new challenges. The primary objective of this project has been to assess the validity of these assumptions, especially as they concern the field of vocational education and training (VET). Two questions in particular have been addressed:

- How does the industry training market actually operate in contemporary Australia?
- How well does the training market meet the needs of employers grappling with the challenges of globalisation?

Structure of report

The report is divided into two volumes. Volume one is a 'synthesis' report where the findings are integrated and the key implications of the research are examined. Details of the findings resulting from the regional industry case studies of the training market in action are reported in the appendix to volume 1. Statistical material and the findings of other desk-based research have been consolidated in a series of technical notes in volume 2, which can be found on disk at the back of this report.

Methodology

The approach adopted to address these questions has been highly empirical. Instead of examining 'globalisation' at large, it focusses very precisely on how the processes of closer international economic integration have worked themselves out in two industries: one 'traditional' and one 'new'—metal and engineering and information technology, respectively. Each was selected because they are commonly recognised as playing a major, if not the leading role in different stages of economic development.

In order to focus the study even more precisely, these industries were examined in two specific localities: South West Sydney and the Hunter, in the case of metal and engineering; South West Sydney and the Central Coast of New South Wales, for information technology. This research design made possible close examination of how the forces of 'training demand' and 'training supply' are operating to meet the needs of employers; that is, those with the greatest responsibility for meeting the challenges of increased international economic integration.

The strategy of undertaking a study of these industries and their training markets at the aggregate, national level was rejected in favour of an approach that combines analyses of the performance of the training markets in a number of specific labour market settings, with consideration of developments at the national level. This strategy offered a number of advantages including:

- the on-the-ground impact of training policy reforms can be more easily assessed
- the differences in demographic, economic and infrastructure conditions becomes integral to the analysis

- the examples of successful (and less successful) adaptations to globalisation can be described

The analysis is not purely data driven. The categories of analysis used in the research have been derived from a critical assessment of the literature on globalisation, especially as it concerns work and VET issues. A comprehensive analysis of the literature is provided in volume 1.

Key findings

Current contexts and challenges

An examination of the operation of training markets in each of these industries necessarily requires an understanding of the labour market in each. Consequently, key characteristics of both industries, and the challenges they currently face is described.

Australian metals and engineering firms have become increasingly exposed to the forces of globalisation. A new and intensely competitive environment constitutes the major challenge facing Australian metals and engineering firms. Training policy therefore must be understood in the context of this more competitive environment.

The industry technology (IT) industry is expanding rapidly and IT workers are dispersed throughout all industries. Defining the training needs for such a diverse group of workers in an environment where technology changes rapidly has been a significant challenge for industry groups and training bodies.

While both the metals and engineering and IT industries confront key challenges which are related to, or derive from globalisation, the precise character of those challenges differs in each case. As a result, and because of the obvious differences in the training traditions, employment demands and organisational and management styles of the two industries, the particular training and skills development problems encountered in each industry differ. Nevertheless, the character and nature of many of the most significant problems are the same for both industries.

Training and skills problems in the metals and engineering industry

- increasing competitive pressure exacerbating employers' traditional failure to make an adequate commitment to training investment and skills development
- employers' lack of knowledge of:
  - the opportunities presented by competency-based training and assessment reforms
  - the means by which competency-based training and assessment can be introduced in the workplace
  - the flexibility of the new training packages
  - the means by which group training companies, networks and co-operative schemes can be used to assist in supporting training
- employers' tendency to attempt to recruit already skilled workers, or buy in skills from labour hire firms, rather than take on apprentices and trainees, or train and develop the skills of existing or new employees
- the prospect of existing skills shortages and skill gaps becoming much worse as the combined effects of declining apprenticeship numbers, less formal structured training and the outsourcing of many skilled functions impact on the labour market

- difficulties attracting high-quality school leavers to undertake apprenticeships
- the range and relevance of available courses, modules, programs and training in various competencies so broad as to be impractical for implementation
- technical and further education's (TAFE) lack of resources and capacity to provide adequate numbers of field officers or industry liaison officers to communicate with industry, thereby preventing the provision of an effective training brokerage service to employers

Training and skills problems in information technology

- employers' failure to make an adequate commitment to training investment and skills development
- employers' lack of knowledge of:
  - the amount and type of training they require
  - the opportunities presented by competency-based training and assessment reforms
  - the means by which competency-based training and assessment can be introduced in the workplace
  - the flexibility of the new training packages
  - the means by which group training companies, networks and co-operative schemes can be used to assist in supporting training
- employers' tendency to attempt to recruit already skilled workers, or hire consultants or contract workers with the particular skills, rather than take on trainees, or train and develop the skills of existing or new employees
- general and specific skill shortages in medium and high level IT
- private, vendor-provided or certified training comparatively expensive, product-specific and relatively technical
- TAFE-provided courses do not enjoy strong industry support or widespread recognition among employers of medium and high end IT skills
- a general lack of co-ordination between training providers and employers

Analysis of the fieldwork data and the conclusions drawn from discussions and interviews with respondents from both industries strongly suggest that the emerging training markets in both industries are not responding to these challenges.

The development of a training market is meant to increase the choice, relevance and cost-effectiveness of training. In both industries there is evidence that this is not occurring.

In relation to the metals and engineering training market, despite the flexible content of courses under the new packaging arrangements, the capacity of employers, trainees and apprentices to access workplace-relevant courses is constrained. This is attributable to several factors, including the limitations of TAFE colleges (class sizes and teacher availability), the inability of private providers (for reasons of cost, complexity etc.) to respond, and finally to a perception within the industry that behind the marketisation push lies a determination by government to withdraw from the public funding of VET.

Within the IT industry the existence of public and private providers purports to provide enhanced training choice. However, concerns over the cost, breadth and portability of private vendor-provided and licensed training have been expressed. On the other hand, TAFE is having difficulty gaining industry acceptance, and reservations remain over the practical competency of many university graduates.

These findings raise serious questions about the appropriateness of current policy settings. Training reforms need to extend beyond the facilitation of industry training markets. In particular, future reform needs to build on previous initiatives to establish new mediating structures that enhance co-ordination between all the elements of these industries' skill formation systems. Trying to make the industry training markets 'work better' will not address the key challenges identified above.

Implementation of competencies, New Apprenticeships and the training packages

Competency-based training and assessment, as well as flexibility, a key characteristic of the new packaging arrangements for training, offer the promise of significant improvements to the delivery and use of VET in Australia. However, the research for this project has indicated that the promise of these reforms has not been realised. The failure of the industry training market approach to reform (at least in the two industries examined) in meeting the challenges of globalisation remains the major problem. However, a series of problems associated with the implementation of competency-based training, New Apprenticeships and the training packages have also been identified.

Problems with competency-based training, New Apprenticeships and the training packages in metals and engineering

- the full implementation of competency-based training and assessment too difficult for most workplaces
- workplaces generally poorly prepared to accommodate the workplace focus, which is an integral feature of the new training package
- employers and some training providers suspect that training under the new packages will not be comprehensive or coherent
- the potential of the New Apprenticeship scheme to remove resources from the training of existing employees
- the competency-based system has established a full range of qualifications but there remains limited demand for lower-level training

Problems with competency-based training, New Apprenticeships and the training packages in information technology

- employers and private providers sceptical of the applicability of competencies in IT training
- many units of competency contained in the IT and administration training packages seen by employers and some training providers as too vague
- competency-based training and assessment often used for reasons other than improving training quality or delivery
- New Apprenticeships sometimes seen and treated as employer subsidies rather than as commitments to training
- IT training packages may not articulate satisfactorily with vendor-provided and licensed training

- possibility of employers and trainees undertaking training programs fully utilising the flexibility of packaging arrangements being frustrated by the absence of satisfactory institutions to assist in the design of those programs

Conclusions

The report identified a series of challenges associated with globalisation and a series of problems associated with the implementation of some of the most significant elements of recent training policy reform.

While the challenges of globalisation and those of training reform implementation are very different (both impacting in different ways in each industry), the analysis of the issues and the fieldwork research signal the need for better co-ordination structures across both industry training markets.

The conclusion of this report is that the problem is not simply one of inadequate or deficient implementation. Rather the challenge is much deeper: it concerns system design. Many of the reforms surrounding the push to an 'industry training market' assume that price is capable of providing an adequate and efficient co-ordinating mechanism. This study reveals that too much is expected of this mechanism. While it can play a role, it needs to be supported by a range of more dynamic and effective mechanisms. Successful mechanisms tend to be regional and industry specific. They enjoy the active participation of firms often in a network or co-operative arrangement. They allow training needs and burdens to be shared. These mechanisms deserve close scrutiny and active government support.

Furthermore, reforms to vocational education need to be located within the context of a wider framework of business development geared to achieving success in a globalising economy. Unless training reform pays closer attention to the business realities of success it is likely to hinder rather than help Australian firms meet the competitive challenges of our times.

Introduction

Current conventional wisdom holds that the forces of globalisation are profoundly reshaping the nature of the economic life in general and working life in particular. Institutional arrangements that may have worked in a previous age, it is often asserted, no longer work today. Changes, especially involving greater reliance on market mechanisms, it is assumed, are required to meet the new challenges. The primary objective of this project has been to assess the validity of these assumptions, especially as they concern the field of vocational education and training (VET). Two questions in particular have been addressed. First, how does the industry training market actually operate in contemporary Australia? Second, how well does it meet the needs of employers grappling with the challenges of globalisation?

The approach adopted to addressing these questions has been highly empirical. Instead of examining 'globalisation' at large it focusses very precisely on how the processes of closer international economic integration have worked themselves out in two industries: one 'traditional', the other 'new'. Metals and engineering was chosen as an example of the former; information technology (IT) as an example of the latter. Both were selected as they are commonly recognised as playing a major, if not the leading, role in different stages of economic development. Metals and engineering workplaces provide the raw materials and means of production used by most other parts of manufacturing and, indeed, service industry. IT establishments provide the infrastructure and means for managing the material at the heart of the 'new economy'—information. To help focus the study even more precisely, attention was devoted to examining developments in two specific localities: South-West Sydney and the Hunter in the case of metals and engineering; South-West Sydney and the Central Coast of New South Wales for IT. This research design made possible close examination of how the forces of 'training demand' and 'training supply' are operating to meet the needs primarily of employers; that is, those harbouring the greatest responsibility in meeting the challenges of increased international economic integration.

Our analysis has not been purely data driven. No analysis can be. In this case our categories of analysis have been derived from a critical assessment of the orthodoxy emerging from the literature on globalisation, work and training reform that has evolved over the course of the 1990s. This literature tends to suffer from a tendency to deal with issues at a quite high degree of abstraction. Moreover, it tends to become fixated with some issues (for example, the supposed rise in significance of 'symbolic analyst' and the knowledge economy) to the neglect of other issues (such as underlying structural problems associated with shareholder value and excess capacity in the world economy). Consequently our analysis begins with an assessment of the mainstream literature of globalisation, especially as it concerns work and VET issues.

Background to the debate on globalisation and industry training

Globalisation has many dimensions. As the former Secretary-General of the United Nations, Boutros Boutros-Ghali has observed: 'There are not just one but several globalisations—of information, for example, of drugs, of epidemics, of environmental effects, and above all of finance' (cited in Martin & Schumann 1997, p.185). This report focusses on the economic dimension and in particular the role of VET in both shaping and being shaped by it.

There is a vast and growing literature on this subject. A number of distinct currents can, however, be identified. The differences primarily turn on how the relationship between economic practice and policy is conceived. In particular, much depends on whether economic change is conceptualised as arising from autonomous market forces or from consciously developed policies or some interaction between the two. Much of the mainstream literature assumes that the processes driving closer economic integration arise from autonomous market and technological forces. Consequently, the primary role of both economic and VET policy is to accommodate these forces. Against this view is the debate within what has been described as the 'social structures of production' literature (e.g. Hollingsworth & Boyer 1997). This holds that policy helps constitute economic and technological forces. Hence policies have more than an 'accommodating' role to play. They actually contribute to shaping the forces of growing international economic integration. Within this literature VET policies in particular have a crucial role to play. This literature in turn has been criticised for underestimating the significant constraints arising from closer international economic integration. For this last school of thought, the challenge is not to identify how independent national policies are to be established in a world of interacting national economies. Rather, the choice is more accurately characterised as figuring out how, if at all, the forces of globalisation can be shaped or managed at the national level. A brief assessment of these intellectual currents is provided below.

Globalisation as autonomous process: Neo-liberal and business consultant analyses and prescriptions

International agencies such as the International Monetary Fund and the World Bank have been actively promoting the view that we live in a world where economic, political and cultural borders are falling. In this context the Organization for Economic Co-operation and Development (OECD) defines globalisation as 'a set of conditions in which an increasing fraction of value and wealth is produced and distributed worldwide through a system of interlinking private networks' (OECD 1992, p.210, in Maglen 1994, p.299). Distinct national economies are becoming increasingly irrelevant and hence domestic economic strategies meaningless. The economic dynamics of the world have become internationalised and dominated by uncontrolled (and uncontrollable) market forces. The implications of these alleged developments have been identified by a plethora of business consultants. Kenichi Ohmae, formerly a partner at McKinsey, has been one of the leading writers of this group. He argues that the key development in recent times has been the globalisation of what he describes as the 'four i's'—investment, industry, IT and individual consumers:

> *Taken together, the mobility of these four makes it possible for viable economic units in any part of the world to pull in whatever is needed for development. They need not look for assistance to pools of*

resources close to home. Nor need they rely on the formal efforts of government ... If allowed, global solutions will flow to where they are needed without the intervention of nation states. On current evidence, moreover, they flow better precisely because such intervention is absent.

(Ohmae 1995, pp.4–5)

Sentiments such as these are widespread in the literature and public policy. The author who has been most influential in developing their implications for VET has been Robert Reich. His most developed ideas on this issue were published in 1991 in the book *The work of nations*. In this he argues, *inter alia*, that the world has changed to the point where transnational corporations no longer have a home base or allegiance to any one country or locality. 'As almost every factor of production—money, technology, factories and equipment—move effortlessly across borders, the very idea of an American economy is becoming meaningless, as are the notions of an American corporation, American capital, American products, and American technology' (Reich 1991, p.18). Consequently, the key issue for economic success in the future turn on the ability to attract such footloose firms.

According to Reich, increased international mobility is having a differential impact on the workforces of the advanced industrial nations. Reich identifies three distinct groups. The first are 'routine production workers' who are exposed to competition from low wage countries. The second are 'in-person service workers' who enjoy a degree of natural protection from international competition because their labour is expended in tasks that require close proximity to end users (e.g. health and legal professionals, hospitality and retail workers). The third are what he describes as 'symbolic analysts'. These are a new class of workers associated with the emergence of the 'knowledge' economy. Typical occupations falling within this group are IT professionals, business professionals and creative workers in cultural industries such as actors and multi-media specialists. They are typically involved in activities that require problem solving, problem identification and/or strategic brokering skills. Reich argues that in today's world the key challenge for any education system is to produce as many quality 'symbolic analysts' as possible. Over the course of the 1980s the demand for these type of high 'value adding' workers has outstripped supply. If a country is to have a future, Reich argues, it must establish arrangements which promote the development of 'symbolic analysts'. Large concentrations of quality workers of this nature will attract the levels of footloose capital necessary for national prosperity.

These ideas have been immensely influential. Reich himself was appointed secretary for labour in the first Clinton administration. In the United Kingdom, the Prime Minister Tony Blair has argued that we are living in a world shifting to what he describes as a new economy based on knowledge in an era of global competition. In such a world where the traditional policy instruments relied upon by governments are allegedly ineffectual, education and training are vital for adapting the population to the new circumstances (Blair 1998). Indeed, initiatives directed at upgrading human resources are commonly regarded as providing one of the key bases for competitive success in an era of globalisation.

Similar sentiments have been expressed in the Australian context. Leo Maglen (1994), for example, has explicitly applied the Reichian approach to Australia. He argues that '[t]he patterns of employment in Australia are changing inexorably—the forces at work in the global economy ensure that—and the country's education and training system must respond' (Maglen, 1994, p.315). Moreover, Maglen links this analysis with the need to promote an approach to VET that is more market based. As he puts it:

What is also called for is for VET to be opened up to a greater variety of providers and modes of study/instruction, and to more flexible financial forms. Moreover, second-guessing the specific technical skills employers are likely to require in an increasingly volatile globalising economy cannot be left entirely to providers. Employers must take the running on that.

(Maglen 1994, p.317; Maglen et al. 1994, p.250)

This analytical current has been subjected to significant critical scrutiny. A number of writers argue that despite all the hype about the impending 'end of the nation state' as a serious economic force, there is a conspicuous absence of an alternative model of how the global

economy is being organised (e.g. Hirst & Thompson 1996, p.2). Allied to this is the lack of historical depth. Emerging trends are allegedly unprecedented. Historical analysis reveals, however, that high levels of international integration have existed in the past both in the world at large (e.g. Hirst & Thompson 1996, ch.2) and especially in Australia (e.g. Bryan & Rafferty 1999, p.9). Most importantly, most economic activity occurs within and not between national economies and most allegedly transnational corporations have a distinct 'home country' (e.g. Hirst & Thompson 1996, chs.3 and 4; Tyson 1991; Moody 1997).

This last finding has been explored in considerable depth by Porter in his monumental *Competitive advantage of nations* (1990). He argues that four national economic conditions are central to a firm's economic success. These are:

- factor conditions, especially the price and availability of quality workers and infrastructure
- demand conditions, especially a strong, sophisticated domestic market to provide a good base from which to launch outwards
- globally competitive suppliers, partly based on costs, but also on proximity as this can help with mutual understandings of needs and response times
- local domestic rivalry and competition to provide an ongoing spur to innovation

As Porter has noted:

> *The role of the home nation seems to be as strong or stronger than ever. While globalization of competition might appear to make the nation less important, instead it seems to make it more so ... The home base is the nation in which the essential competitive advantages of the enterprise are created.* (Porter 1990, p.19)

These criticisms of globalisation as an autonomous and all encompassing process indicate that policy concerns more than accommodating allegedly inevitable forces of change. Policy can, instead, actually constitute the forces at work. How then is policy most accurately understood as a force that can shape the processes of globalisation?

Reasserting national autonomy: Recent developments in the social structures of production literature

Hirst and Thompson's recent work on *Globalization in question: The international economy and the possibilities of governance* (1996) consolidates much of the recent literature from this analytical tradition. Despite all the interest in the phenomenon, they note there is no agreed or unambiguous definition of the term 'globalisation'. To overcome this, they propose two models or ideal types of international economy to help guide their analysis. The first is what they describe as 'an inter-national economy'. The key features of this are that the principal entities are national economies. In this model multinational companies have clear home bases. Moreover, while the current flow of goods, services and funds is freer than in the recent past, this is merely a matter of degree and not qualitatively different to what prevailed in the past (Hirst & Thompson 1996, pp.8–9). The second model is what they describe as 'a globalised economy'. This is a global system where 'distinct national economies are subsumed and rearticulated into the system by international processes and transactions ... The international economy is an aggregate of nationally located functions ... The international economy therefore becomes autonomized and socially disembedded, as markets and production become truly global' (Hirst & Thompson 1996, p.10).

They use this dichotomy to clarify what is occurring. In particular they are keen to emphasise that:

> *the opposite of a globalised economy is thus not a nationally inward-looking one, but an open world market based on trading nations and regulated to a greater or less degree both by the public policies of national states and by supra-national agencies. Such an economy has existed in some form or*

another since the 1870s and has continued to re-emerge despite major setbacks, the most serious being the crisis of the 1930s. The point is that it should not be confused with a global economy.
(Hirst & Thompson 1996, p.16)

This approach to the question opens up considerable space for policy (especially at national level) to shape economic processes outcomes. In this way, Hirst and Thompson provide updated analytical underpinnings for earlier studies on the importance of different skill formation arrangements for international competitiveness. These studies have consistently shown the superiority of multi-employer, institutionally co-ordinated arrangements over those based on the enterprise and market approaches. Researchers at the National Institute of Economic and Social Research (NIESR) in the UK, for example, have conducted a series of industry studies in which British enterprises were compared with French and German enterprises of similar size and with similar technology (Prais, 1995; Prais et al. 1989). All these highlight the importance of skill formation and work organisation for Germany's superior performance in the engineering, clothing, furniture production, retail and hospitality industries. The most comprehensive international comparative study of this nature was undertaken by a group of French and German researchers in the 1970s and 1980s (Maurice et al. 1984, 1986; Lutz 1992). Their work was based on detailed analyses of 12 matched plants of similar size and technology in the German and French metals and chemical industries. On the basis of their studies they argue that bargaining arrangements and company performance are profoundly influenced by vocational education and management structures. German managers could delegate more control to their blue-collar employees because the German labour force was, on average, more highly skilled than the French. French managers had smaller (i.e. tighter) spans of control and relied more on training provided by the enterprise because of lower skill levels. The German training system has enjoyed a higher level of employers' involvement than most, with employers collectively contributing to training the workforce. The high reliance on training within enterprises limited the flexibility available to French managers in the workplace.

More recently, attention has been devoted to understanding how sectoral issues intersect with regional dynamics to structure clusters of firms that succeed in the global economy. Hollingsworth and Boyer (1997), for example, argue that:

not all of a country's sectors compete and perform equally well. Some social systems of production perform better in some product markets than in others. Most countries succeed in a few industrial sectors but not very well in most. National success tends to occur when there exist clusters of sectors that are complementary to one another. Most industrialised countries rarely have sectors that are not part of clusters of sectors performing well at the global level. Moreover, firms within globally successful sectors are often concentrated within specific regions or districts of countries where they are part of similar social systems of production.
(Hollingsworth & Boyer 1997, pp.37–38)

Ideas of this nature have also been developed in Australia (Cole & Larcombe 1998; Crawford & Cole 1998). They argue that globalisation, understood as the greater integration of production, trading and financial systems, has major implications for the regional location of jobs and hence training demand. The key spatial forces that they identify are concentration, dispersal and marginalisation. These forces are most intense in what they call 'global cities', i.e. key nodal points in the world economy. Cole and Larcombe explain the nature of these forces as follows:

- Concentration arises from the location of 'higher order financial and business services, stock exchange facilities and, more recently, multimedia services in central business districts (CBD) of major cities'.
- Forces of dispersal primarily involve service industries to meet demand of growing population in suburbs. 'New industrial and distribution centres relocate to cheaper outer employment zones as the city grows.'

- Marginalisation arises where regions become disconnected from economic growth of the global city. Such regions are characterised by marginal firms, a growing informal economy and a low skill, low income workforce (Cole & Larcombe 1998, p.3).

In developing ideas on how the less desirable spatial outcomes of globalisation can be addressed, these authors develop the notion of 'community learning networks', i.e. networks that link all aspects of community, learning from child-care facilities through to higher education, workplace learning through to public libraries (Crawford & Cole 1998). They argue that the importance of information is missing in what they describe as an increasingly knowledge-based economy. In this context they assert that 'the key drivers of development are increasingly social capital, human capital and technology (including telecommunications infrastructure)' (Cole & Larcombe 1998, p.15). Policy therefore needs to address issues of information rather than the traditional concern of regional development; relative wages or factor endowments. Analyses of this nature have considerable prima-facie appeal. As Cole and Larcombe argue, this means 'Community Economic Development is becoming a mainstream tool of economic development. The goals of social justice and economic development are entirely compatible' (Cole & Larcombe 1998, p.21).

Desirable as these outcomes may be, this mode of analysis suffers from a number of serious limitations. Too much efficacy is attributed to deliberative social action. While it may make desirable social policy, its actual purchase in a world of harsh economic realities appears limited. The limitations of the 'training-led recovery' vision to a country's productivity problems have been comprehensively identified by Tony Cutler (1992). As he argues, most of the problems affecting UK manufacturing firms analysed by NIESR did not arise from skill shortfalls but rather from the economic structures within which they were embedded. The key feature of this environment in manufacturing is that factories are treated as financial assets to be bought and sold and not primarily regarded as productive assets to be developed. As he put it: 'In the world of financial control retained businesses are there to generate profit not via growth but by tight control of costs, assets are made to "sweat"' (Cutler 1992, p.178). Changing skill formation arrangements will do nothing to address the underlying structural problems arising from the primacy of concerns with shareholder value.

The more recent work on regions is merely a reworking of the problem in a different spatial context. Whereas NIESR studies focussed on developments within workplaces, the researchers of regional development focussed on localities at large. The same general problems afflict their analysis. If the underlying incentive structures favour the pursuit of shareholder value defined in the short run, no training reform, whether workplace or community based, is likely to make much difference. The problem is all the more pronounced for those parts of the economy engaged in manufacturing. A range of researchers as diverse as the leading socialist historian Robert Brenner (1998), stretching to the Economic Intelligence Unit and the Australian Industry Group (MTIA 1997) have all identified a key underlying problem in the world economy as one of excess capacity. Unless problems of this nature are addressed directly, no amount of training at workplace, industry or regional level is likely to make much headway.

Our conclusion is, therefore, that while the 'globalisation as autonomous force' is overly deterministic, greater realism is required in assessing how policy can address the challenges of globalisation. As Bryan and Rafferty note: 'National institutions can make a difference, but not in circumstances of their own choosing' (1999, p.220). The challenge therefore becomes one of understanding more carefully the nature of those circumstances and not ascribing too much efficacy to national institutions.

Shaping globalisation processes at the national level: Recent developments beyond the mainstream and social structures of production literature

Bryan and Rafferty (1999) have recently released a comprehensive consideration of these issues. They argue that it is important to understand the nature of *the global economy in Australia*, and *not* conceive of the problem as *Australia's place in the global economy* (1999, p.xxiii). Such an approach results in a different formulation of the constraints and options at stake. Hence the challenge is not to work out how best Australia can regain its economic sovereignty. Rather, the challenge is to identify how best to manage the challenges of global economic forces. In making their case, Bryan and Rafferty note that 'cross-border flows, while growing rapidly, are still significantly less than flows within nations' (1999, p.32). But they argue this does not mean global forces are thereby less significant. For them, globalisation is not simply determined by quantitative issues such as the volume of exports and imports traded. Rather, globalisation is more accurately defined as working as a discipline on a growing number of areas of economic life. This discipline operates within Australia as well as more broadly throughout the world economy. As they put it:

> *Imports discipline domestic prices; global finance markets dictate exchange rates ... the possibility of investing outside Australia disciplines the calculation of when to invest inside Australia; and the need to export from Australia disciplines wages and employment conditions within Australia. What is domestically determined cannot be disentangled from what is globally determined.*
>
> (Bryan & Rafferty 1999, p.32)

When thinking of polices, they argue that it is important to work within 'a framework of global integration of accumulation, not models of national interaction' (Bryan & Rafferty 1999, p.32). As a result of globalisation, Australian economic activity now has to meet international competitive standards of what they call the three P's—prices, productivity and profitability (Bryan & Rafferty 1999, pp.xviii–xix). More often than not the pressures arise from what Botwinick (1993) calls 'governing capitals'. These are the leading firms within any sector which set the standard for market success. The role of public policy is to help facilitate achievement of the three P's. How this occurs is an open question. One path is the neo-liberal one advocated by mainstream economic policy commentators. Another involves active State orchestration such as the approaches of Western Europe or Japan. But while there is no fixed path, the objective is common. Consequently the policy choices are very constrained. To repeat Byran and Rafferty's (1999, p.220) aphorism: 'national institutions make a difference but not in circumstances of their own choosing'.

In developing their case, Byran and Rafferty take issue with Hirst and Thompson. The latter, they argue, under-estimate the extent of global integration and consequently over-estimate the level of national policy choice available to respond to the challenges. Consequently, the key issue for policy is not to assert the need for national policy autonomy. The choice is, in fact, more constrained. As they put it:

> *Now ... the national twist pertains to particular national paths to achieving the globally universal goal of nurturing 'competitive', international profitability corporations. As such, national policy creates the global economy in Australia. It is at once a distinctively national project and a process of global expression.* (1999, p.219)

Having identified more precisely the space for policy choice, Byran and Rafferty do little to flesh out the options available. (Their primary suggestions in this regard are calls for the Australian Bureau of Statistics (ABS) to change its basis for data collection—i.e. processes of international accumulation as opposed to maintaining national accounts as the 'Australian economy'—and the need to use living standards as well as profits as a criteria for evaluating policy outcomes. See Bryan and Rafferty 1999, pp.142–146.) Overseas researchers have undertaken a more precise exploration of the issues concerned. Writers such as Martin and Schumann (1997), for example, argue that there is nothing wrong with globalisation *per se*. Indeed, it has delivered spectacular productivity gains (Martin & Schumann 1997, p.233). The

challenge is to manage the processes more fairly and in a more ecologically sustainable fashion. Similar issues have been identified by Froud et al. (1998, 1999). The key problem in this regard arises from the operation of world capital markets. Capital markets have always had considerable influence in shaping economic development. Their influence is now so pervasive, however, that the primary (if not sole) criterion for economic success is that of 'maximising shareholder value'. The constant pursuit of this objective has profoundly shaped the globalisation process and needs, according to these authors, to be seriously questioned. For what is good for short-term shareholder interest often does not coincide with desirable social or, indeed, longer term economic objectives. The most serious adverse economic consequences are the chaotic development of productive capacity and the increasingly skewed (i.e. unequal) distribution of income. Indeed, researchers such as Henwood have demonstrated that stock markets such as Wall Street operate primarily as markets for control of economic assets and access to income streams. They have little to do with the rational, let alone orderly, allocation of capital for economic ventures (Henwood 1997).

But the constraints of globalisation do not just arise from capital markets. As noted earlier, a major challenge facing many manufacturing firms in particular is chronic excess capacity in world economy (Brenner 1998; MTIA 1997). This excess capacity results in intense competition in product markets and hence a tight squeeze on margins.

Developments in both capital and product markets provide the context for the labour market. Given the problems of shareholder value and excess capacity, intense pressure comes on managing labour costs. The challenge is to constantly reduce the labour cost content of production to remain competitive (Williams et al. 1995). This can be partly achieved by boosting labour productivity. But this only concerns labour costs of production which affects the situation in product markets. Labour share of value added is also a key issue of concern to shareholders for, by definition, shareholder returns are increased if labour's claim on value added is diminished. When considering how successful a venture is, global economic calculation assesses both unit labour costs as well as labour's claim on value added (Williams et al. 1989, 1995).

As is clear from this analysis, issues of industry training and skill formation are, at best, one very small part of the equation of success in a globalised economy. While they may contribute to reducing unit labour costs, this is only one small part of the challenge. It has long been recognised that skill formation policy should not be conceived as operating independently of other realms of policy concern. The need for such a perspective is truer today than ever before.

The real challenge for policy, especially skill formation policy, is to ascertain how to effectively grapple with these forces. Clearly one of the major issues concerns competition. It was noted earlier that in his *Competitive advantage of nations* Porter argued domestic competition and rivalry was vital to establishing internationally competitive clusters of firms. But in a world of excess capacity this could foster a local 'war of all against all' thereby hastening the day of 'creative destruction' as global excess capacity is rationalised through driving smaller operators to the wall. More sophisticated ways of managing competition need to be identified in such a situation. The United States economic historian William Lazonick has been amongst the most sensitive researchers to consider this issue. He re-examined the detailed industry studies underpinning the *Competitive advantage of nations*. On the basis of this reassessment, Lazonick argues that Porter's preoccupation with rivalry resulted in a neglect of the institutions of co-operation. Such conditions determine whether the competition is cut-throat or spawns continuous innovation. As he puts it:

> *domestic rivalry is an important determinant of enterprise strategies. But the substance of these competitive strategies—specifically whether they entail continuous innovation or cut-throat price-cutting—depends on how and to what extent the enterprises in an industry cooperate with one another ... Again and again ... Porter['s case study evidence] articulates the centrality of domestic co-operation.* (Lazonick 1992, p.6 in Harrison 1994, p.227)

Examples of co-operation identified by Lazonick include 'government sponsored technical institutes', 'ties through the scientific community or professional associations' and sometimes

'family ties' (Harrison 1994, p.227). Arrangements such as these are the glue that holds competitive clusters of firms together.

Lazonick then uses this augmentation of Porter's analysis to provide a further critique of Reich's assessment of the importance of 'symbolic analysts' for allegedly underpinning the success of USA firms both at home and abroad. Rather, he argues this success arose more from arrangements that contained a better blending of the forces of competition and co-operation than superior approaches to producing 'symbolic analysts'. Symbolic analysts may have made big money, but this was not as a result of superior 'value adding' activities. Rather, these people were primarily involved in 'extracting value' from pre-existing assets; for example, real estate, mergers, takeovers and asset stripping. Developments of this nature were nationally specific (Harrison 1994, p.229). In the USA and UK, markets for control existed and hence allowed the developments of the 1980s to emerge. Such developments were rarer in Japan and Germany at the time. Hence while the forces of globalisation are all pervasive, the way in which the challenges are managed is open. National constellations of forces, of which skill formation arrangements are one aspect, can shape the responses to the challenges of globalisation. Market-based approaches predicated on increased levels of competition may offer less than optimal arrangements to meeting the challenges of globalisation if they are not firmly embedded in underlying structures of trust and co-operation.

Conclusion

Much of the conventional wisdom on globalisation has been informed by accounts of the process peddled by neo-liberal economic commentators and business consultants. According to this account, the economy is becoming globalised and dominated by uncontrolled (and uncontrollable) market forces. The policy choice offered by this school is 'surrender or die'. The best VET policy can do in the face of these forces is accommodate these pressures. According to Reich's influential formulation, the education system of a country can best respond by producing the highest number of quality 'symbolic analysts' possible so as to attract stateless companies. The weaknesses of this position have been clearly identified by critics from a number of intellectual currents. Arguably, however, the clearest evidence of the inadequacies of this analysis has been provided by Reich himself. This arises from his own experience in trying to implement the policy agenda he proposed. As USA secretary for labor in the early 1990s he was responsible for helping implement a key part of Clinton's election commitment of 'putting people first'. This involved, amongst other things, proposals to put an extra US$50 billion a year into education. VET initiatives were a major part of this and included proposals to introduce apprenticeship systems in companies for young people still attending school. The thrust of these proposals was defeated, primarily by resistance led from Wall Street. The primacy of shareholder value concerns was clearly evident to Reich from this experience. His conclusions of this experience were stark:

> *Never before in the history of mankind have the feelings of the street had such decisive force. The ancients worried about the moods of the skies, mountains, seas and forests. We are just placating a pavement. We are only worshipping Wall Street.* (Reich 1997, cited in Martin 1998, p.12)

Reich's experiences also highlight the limitation of the social structures of production school. While this school has established that globalisation does not close off policy choices, researchers in this tradition seriously underestimate the constraints on policy. Their analyses offer interesting ideas on the role VET might play in a nation's strategy for competitive success. They tend to underestimate, however, constraints arising from the problems of shareholder value, excess capacity and the pressures both place on labour cost. Unless VET policy is clearly located in a broader policy mix that responds to these challenges, it is likely to have only a marginal impact on the needs of business. At worst, it could be counterproductive if it undermines arrangements that effectively blend the forces of competition and co-operation so vital for meeting the competitive challenges arising from globalisation today.

Research design

With the issues about the nature of globalisation and the role of industry-training arrangements in both shaping and being shaped by it clarified, it is now necessary to consider issues of research design. It will be remembered that we are interested in two questions. First, how well does the industry training market actually operate today? And second, how well does it meet the needs of employers grappling with the challenges of globalisation? Any analysis of these questions requires some working definition of the term 'training market'. It also requires a systematic approach to the collection and analysis of data to ensure quality information underpins the analysis. Definitions and research design are summarised below.

Definitions

We define the training market as a set of institutional arrangements involved with the allocation of skills (especially credentialled skills) on the basis of price. These are *supplied* by training providers. They are *demanded* by workers and firms. In theory, credentials/skills are allocated by price signals. Demand is determined by the returns available to those investing in training, supply by the relative cost of production.

The emergence of the training market represents a shift from a training system based on non-market principles of education administration. This shift has been promoted, in part, to help improve efficiency in the provision of skills in Australia. The need for such an improvement is intense due to heightened international economic integration and competition—commonly referred to as 'globalisation'.

Markets, however, do not emerge spontaneously. They need legal and institutional conditions of existence. Any understanding of how a market operates therefore requires an appreciation of the actual *institutional forms of vocational education and training*. These are institutions involved with providing skills directed at improving human performance at work.

The debates associated with the meaning of the terms 'training markets', 'globalisation' and 'VET institutional arrangements' are discussed in detail in technical note 1 in volume 2.

A framework for fieldwork

In examining how the training market works we have drawn from a framework for operationalisating abstract concepts empirically. This framework has been pivotal in guiding our fieldwork priorities and lines of inquiry. The framework is summarised in table 1. It is based on two axes; one contains the elements of any market, the second deals with definitions and institutional forms of a market. Categories falling in the first group are:

- supply (of a good or service)
- demand (for a good or service)
- allocative mechanisms that match the two
- the framework providing rules of market behaviour

Table 1: The Australian training market: A framework for fieldwork

	Basic elements of a market			
	Supply	Intermediary	Demand	Framework
Definition	Provider of credentials, i.e. proxy for skill/ competence	Price	Acquirer of skill/competence	AQF
Organisational form of market agents	Off-the-job ❖ registered ❖ unregistered ❖ On-the-job ❖ registered ❖ unregistered	Administered and/or prices, e.g. costs of TAFE course.	Workers ❖ employees ❖ contractors ❖ Firms ❖ with employees ❖ outsourcing/labour hire	ARF
Non-market arrangements supporting the operation of market relations	Occupational customs and practices (usually informal)	GTCs, NACs	Government - user choice funding arrangements, e.g. private government of public funds	Government-funding arrangements

In understanding particular markets, attention also needs to be given to the organisational form of the market agents and non-market agents which support the operation of market relations.

This framework highlights that to date most attention has focussed on formal features of the training system and that insufficient attention has been paid to the importance of non-market arrangements required to support the operation of market relations. The healthy functioning of markets is dependent upon public goods such as occupational notions of standards and commitments to reproducing skills on the supply side. Government funds are central to the demand side.

Fieldwork strategy

Our strategy for data collection was informed by our clarification of key terms, understanding of industry contexts and our framework for operationalising key terms. It involved a sequenced set of activities. These can be summarised as follows:

- Description of the industry context in which the industry training market operates.

  Aim: To provide an understanding of the context in which skill formation issues operate, especially concerning the nature and levels of output produced, employment trends and recent economic performance.

  Outcome: Overview reports of recent developments in the metals and engineering and IT industries. Full details are provided in technical notes 3 and 4.

- Description of the key features of the training market in operation in the four industry regions selected for detailed analysis; metals and engineering in South-West Sydney, metals and engineering in the Hunter, IT in South-West Sydney and IT on the Central Coast.

  Aim: To describe the important features of the training market identified in the framework for analysis.

  Outcome: A description of the elements of each of the regional training markets. Information about these issues is contained in the appendix.

- Exploration of how different parts of the training market interact to produce credentials/skills that are applied in the workplace.

  Aim: To understand how the market works to deliver useful skills in a number of strategically selected workplace settings.

  Outcome: A number of case studies of workplaces/enterprises in the industries in the localities under review. Details of these are provided in the appendix.

- Analysis of how all the elements interact by integrating information obtained from the descriptive and exploratory stages noted above.

Characteristics of the fieldwork

The case studies of the four regional industry training markets constitute the empirical core of the project. As noted above, metals and engineering and IT were chosen because of the capacity of those industries to provide divergent cases against which the impact of globalisation could be assessed. Both are clearly critical industries in terms of employment, skills development and potential or actual contribution to export earnings or import replacement. Both are generally thought to be exposed to globalisation pressures and forces. The metals industry has been subject to intense competition in the local and export markets and has extensively restructured its traditional industrial and skill formation arrangements over the last 15 years. The IT industry has seen large growth over the last decade and has

allegedly been subject to skill shortages that are currently the focus of intense discussion within the industry.

The strategy of undertaking a study of these industries and their training markets solely at the aggregate, national level was rejected in favour of an approach that combines analyses of the performance of the training markets in a number of specific labour market settings with consideration of developments at the national level. There are clear advantages associated with this method. The most important are:

- that the 'on the ground' impact of training policy reforms can be more easily assessed
- that the differences associated with the demographic, economic and infrastructure conditions of different regions can be brought into the analysis
- that examples of successful (and not so successful) local adaptations to global pressures and national policy changes can be described in some detail

The method also has certain limitations, however. The regional industry case studies provide a rich insight into the way four particular industry training markets are functioning in practice, and while they clearly indicate some of the problems and issues associated with current policy responses in a globalising environment, care must be exercised in generalising to all training markets in Australia.

The Hunter, the Central Coast and South-West Sydney were chosen for a variety of reasons. The choice was made partly to reduce travel costs but also because, for South-West Sydney in particular, there is a range of unpublished surveys and data available. (The limitations of basing the analysis in New South Wales were noted in a workshop on findings with the metals and engineering ITAB. Any future study should deliberately get the resources necessary to examine developments in different States. From our experience on other projects, for example, the implementation of training reform appears to be more advanced in Queensland and Western Australia in the metals and engineering sector.) Metals and engineering has traditionally been a major employer in the Hunter. The region has suffered more than most from the industry's rationalisation and restructuring over the past two decades yet it continues to be critical to the region. Metals and engineering has been significant but less dominant in South-West Sydney, a less naturally bounded labour and training market than that provided by the Hunter example. By contrast, IT is a relatively 'new' industry, and the study attempts to investigate its penetration into labour markets outside the traditional Sydney city and North Sydney heartlands. Skill shortages are widely seen within the industry to be a major present and future constraint on growth. South-West Sydney and the Central Coast are both expanding labour markets with an abundance of under-utilised labour. The Central Coast, in particular, has been identified by governments as a potential site for new and relocating IT businesses.

The three labour markets—the Hunter, the Central Coast and South-West Sydney—are described in greater detail in the appendix of this report. The four regional industry case studies of the training markets are also presented in that appendix.

Integration of findings

We are aware that care must be exercised in generalising from the experiences of a limited number of case studies. In drawing our conclusions, however, the findings in this report have drawn on both the analyses of overall industry developments as well as the more detailed qualitative material. Reliance on both types of data means we can comment on apparent industry-wide trends as well as micro processes as they occur in the particular sites studied.

Key findings

Labour market settings

In making sense of how training markets function, it is important to understand how they operate in different labour market settings. We are examining two industries that have been profoundly affected by globalisation; metals and engineering, and IT. The key features of the industries can be summarised as follows. The detailed material from which this is drawn is provided in volume 2.

The metals and engineering industry

The metals and engineering industry employs over half a million people across a range of manufacturing and non-manufacturing industries. The single largest segment of the industry, metal manufacturing, has experienced dramatic structural changes over the 1980s and into the 1990s. Levels of international competition have increased, eroding domestic market share for producers of elaborately transformed goods, but having lesser impact on fabrication and casting/forging workshops. While exports are up, this is from a low base and has not made up for loss of domestic market share. Despite these developments, overall output levels have not declined, remaining stable around a cycle that is closely linked to domestic economic booms and recessions. Employment levels have, however, fallen dramatically. Although there have been some modest employment gains in the last few years, these have done little to offset the falls of between 30 and 40 per cent in key metal manufacturing industries in the decade to 1991–92.

The maintenance of output levels in the face of declining employment implies significant productivity improvement. The benefits of this appear to have been passed on to consumers in the form of lower prices and to employers/owners in the form of a larger profit share. Not surprisingly, labour shares of turnover and the value added component have declined over the same period. In parallel with these developments, workplace size has fallen, with the declines greatest in those industries with the smallest proportion of workers in factories with 100+ workers; metal fabricators and in the machinery, electrical and electronic industries. The limited indicators of economic performance reveal highly volatile investment patterns and profit. Levels of volatility are greatest for capital intensive sectors. The heartland of metals and engineering, fabrication and machinery, electrical and electronic manufacturing have performed pretty close to the manufacturing average with less volatile swings.

The information technology industry

This industry is characterised by rapid technological change, short product life cycles and a market where prices for both products and services are constantly falling. This technology-driven product market makes it difficult to capture productivity gains. The structure of the industry is also constantly changing as the convergence between communications and the media progresses and business use of IT increases. As the definitional issues remain unresolved, both within the literature and amongst practitioners, estimates on the value, size and employment in the industry vary widely. As a consequence the IT industry tends to be referred to in two ways, the more specific information technology and telecommunications industry (IT&T) and the broader information services industry which incorporates the range

of IT activities performed across all industry groups. Using the ABS definition there are around 250 000 employed directly in the IT industry in 1995–96; however, IT&T professionals, programmers, systems analysts, operators and the range of IT management which support business and government account for an additional 250 000 persons, giving a total information industry employment of around half a million employees or ten per cent of the labour force.

In 1995–96 the information industry market was estimated to be worth between A$55 billion and A$67 billion, depending on the breadth of industry definition. This represents 6.3–7.5 per cent of national GDP. It is expected that this figure will continue to grow. While the demand for IT products and services has grown dramatically, much of this demand has largely been met by imports. As a consequence, the information industries account for 20–25 per cent of Australia's ETM (elaborately transformed manufacturers) trade deficit. In 1995 the Australian trade deficit in IT&T was estimated at between A$7 and A$14 billion (depending on industry definition) and is projected to grow, if conditions remain unchanged, to A$22–46 billion by 2005. While domestic demand may not be satisfied from local products, the information industries are amongst Australia's top export earners, with exports exceeding $4 billion in 1995.

These different settings provide fertile ground for seeing how the general principles informing the training market actually operate in practice.

Key challenges confronting the metals and engineering industry

Australian metals and engineering firms have become increasingly exposed to the forces of globalisation. In particular, these forces have seen levels of competition from overseas manufacturers and suppliers increase and the export emphasis of domestic producers and suppliers increase. The data presented in technical note 3 of this report shows levels of exporting and import penetration for the four key areas of the metals manufacturing sector. In all bar one of these areas (basic steel and iron), domestic producers' share of the Australian market has decreased, most notably in machinery, electrical and electronic equipment and appliances where domestic market share fell from a half to a little over one-third between 1981–82 and 1991–92. Exports have increased, in some cases more than doubled, in all sectors, admittedly from a low overall base. The effective rate of assistance for four of these five industry areas (basic iron and steel again being the exception) was cut over the period, in many cases quite drastically. In the transport equipment sector, assistance has dropped from 71 per cent to 31 per cent. In fabricated metal products, it has fallen from 31 per cent to 16 per cent.

This new and more intensely competitive environment constitutes the core of the most severe challenges facing Australian metals and engineering firms. In general, demand for products has become more volatile, markets more diverse and prospects less predictable. As a result of the restructuring and rationalisation of the industry and the firms within it, production capacity has become fragmented as organisations become leaner, smaller and, in many cases, more focussed. In turn, these forces have been associated with strong pressures on costs and an intensifying imperative to increase productivity. With persistent problems of inadequate capital expenditure on new technology and equipment, much of the burden of achieving increased productivity has been forced onto labour productivity. And labour productivity *has* improved—as indicated by other data in technical note 3; output levels have been sustained while employment levels have been falling.

Work reorganisation, the reform of workplace practices, greater labour flexibility, the broadening of most workers' range of work tasks and overall work intensification have been the hallmarks of the contemporary push to greater labour productivity in the sector. Questions concerning the place of training and the analysis of problems with the metals and engineering training market must be understood in this context. Decisions about the amount, quality, type and focus of training are increasingly in the hands of managers. The active policy

to move toward an industry training market increases the significance of decision-making at this level. *For workplace and firm managers, training is seen as part of the process of business reorganisation in the context of globalisation and intensified competition. By and large it is not seen by managers in the context of the changes made to broader training policy settings.* The relevance of training is always an issue. The direct and immediate costs of training are an issue. Being able to secure skilled workers in the future is an issue. But these are not the main issues for Australian metals and engineering managers. If policy-makers want to understand why managers are not necessarily automatically predisposed to spending more on training, they need to understand the realities of the economic environment in which those managers are currently implicated.

The main point is that questions about training policy must be understood in the context of the more competitive business environment in which all industries, especially those in metals and engineering, find themselves. Fragmented markets, fragmented capacity and volatile demand do not augur well for the prospect of employers making long-term investments in skill development or for being prepared to carry a little excess capacity in the short term in order to secure a better trained workforce in the long term. All the forces of globalisation and increased competition are working against this—downsizing, outsourcing, pressures on labour costs, the imperatives to constantly improve labour productivity in the short term all militate against the long-term investment in skills development that a commitment to training involves.

The push to the marketisation of industry training does little to remedy this situation. In fact it is likely to continue to exacerbate the tendency to adopt the short-term perspectives that currently inform management decisions about training.

The workplaces visited and studied as part of the metals and engineering industry training market case studies reported in the appendix reflect many of the forces, changes and challenges identified above.

All seven of the firms studied in the Hunter region have become increasingly exposed to global forces over the past 15 years.

Two of the workplaces (referred to in the appendix as *large steel product plant* and *large processing plant*) directly compete with overseas producers in an intensely competitive global market. Neither export but both are involved in import substitution. Pressures on labour costs are particularly intense, and both have undergone, and are still undergoing, comprehensive workplace reorganisation. Both have been somewhat pre-occupied with what might be termed 'training for workplace change', but both also have obvious needs to increase the formal, structured training that is provided to their process and production workers.

Two other large workplaces (*large steel processor and manufacturer* and *medium to large engineering works*) do not directly compete in a global market nor are they directly involved in import substitution; however, both have been dramatically affected by the contemporary global pressures. Both are dependent on supplying product to a relatively small number of major producers who are themselves locked into domestic markets where they face fierce competition from overseas producers or suppliers. One of these firms also confronts an uncertain environment associated with recent changes to its ownership structure. Concerns were expressed that the new arrangements may expose the company to more direct and immediate shareholder pressures which could result in a major rationalisation of the business.

Another workplace (*large specialist manufacturer*) supplied a relatively low volume, high value-added, finished product market that features a significant number of overseas competitors. In light of recent downturns, the workplace was increasingly turning its attention, with some success, to overseas markets. While its current export earnings were modest, it clearly sees its future in exports.

One of the smaller workplaces studied (*small equipment manufacturer*) is a very successful player in a highly competitive global market. Approximately 50 per cent of its production is directed toward supplying overseas markets on long term supply and maintenance contracts.

The remainder of the firm's production output faces very intense competition from overseas manufacturers.

The last of the firms studied (*medium maintenance service*) provides support and maintenance services to various operators in different extractive industries in the region. As such, the firm does not directly compete with overseas competitors nor does it supply a global market; however, it is again acutely aware of global forces. The fortunes of all its mining and energy industry clients are intimately associated with trends in world commodity markets.

The five workplaces examined in South-West Sydney provided a similar, though slightly different, set of stories about the impact of globalisation in recent years.

One of the biggest workplaces studied was involved in producing *large industrial and commercial light fittings*. It employed over 300 workers, mostly engaged in jobs below trades level. It currently exports about five per cent of output and is actively exploring new overseas markets, especially in Europe. It is experiencing increasing import competition from low wage countries such as China. Because it uses a very labour-intensive production process, new approaches to work organisation have been central in its responses to this competitive pressure. The key changes have involved movement to cellular team organisation throughout the workplace. This change has been accompanied by the introduction of new production technology. Much of the training has been in basic language skills to improve the quality of communication in the workplace generally and especially to underpin its new quality management processes. To date, these training-related reforms have been important in defending market share. The operations manager reported, however, that supportive industry policy will also be important because, currently, while overseas Asian competitors have near free access to the Australian market his firm faces tariffs of at least 30 per cent in theirs.

A *large producer of specialised aircraft components* reported that nearly all their output is exported. As such the workplace suffers significant fluctuations in demand. Currently, demand is falling owing to a decrease in orders for new aircraft resulting from the Asian economic crisis. The company has a long tradition of well-developed training arrangements to help produce a highly skilled blue-collar workforce that is overwhelmingly comprised of high level tradespeople. The major difficulty the training area of the company faces is justifying its budget to the firm's accountants. While they understand the importance of training, they are becoming increasingly interested in costing out the benefit of training expenditures. The most significant challenge facing the establishment, however, is the volatility of demand. While it is currently flat, it is possible that it could surge quite quickly, in which case the problem will be one of insufficient numbers of skilled workers to meet demand. During the last big upswing, the late 1980s problems of this nature were so severe the firm had to recruit skilled labour from overseas to meet demand.

One of the most interesting cases studied was a *medium-sized toolmaking establishment*. The manager of this site reported that the biggest problem facing the producers of specialised components for machine tools (i.e. the toolmaking industry) is that it suffered from a tradition of excessive competition. In the era of import protection, toolmakers engaged in cut-throat competition to win a share of the domestic market. The legacy of this production culture is that it undermines the ability of the industry to co-ordinate capacity to offer serious challenges to toolmaking concerns overseas. This establishment has gone from exporting no output to exporting 50 per cent of turnover in four years. It is now involved in creating partnerships with other toolmakers in Sydney so that, in concert, they can bid for a wider range of overseas jobs than would be possible if they operated alone. The manager is currently trying to broaden this approach to industry development to a larger number of firms to improve the capacity of the industry to win a bigger share of the world toolmaking trade. Prime amongst these is the development of a new Australian Toolmakers Institute to co-ordinate marketing, research and development and product-testing facilities. The formation of a specialised toolmaking group training company also makes up part of this proposal.

The *manufacturer of specialised pressure vessels* provides an insight into how engagement with world trade can change over time. Twenty-five years ago this workplace exported about 50

per cent of its output. Exports are now down to just 5 per cent. This outcome does not reflect poor performance but, rather, the growth in overseas firms, especially in Asia, now producing what was previously imported from this establishment. This firm has taken a strategic approach to this development and licensed its production process to producers in these countries. This was a hard decision to make at the time but regarded as inevitable. If this Australian company had not done it, someone else would have. Consequently, licensing fees now provide an income stream for research and development. In this way the Australian firm remains one step ahead of its overseas competitors and hence always has additional expertise it can sell on to them. To date this company has prospered by producing for the local market. This is now under threat as acceptable standards for pressure vessels have been relaxed and lower quality imports are entering the market. According to the general manager, the only way to match this challenge is to increase innovation. This requires both increasing resources for research and development into improved productive technique and augmenting the skills base.

Australia has an advantage in that it is recognised as being an advanced, skilled country in Asia for engineering processes such as those undertaken by this factory. This advantage could be lost, however, if investment in research is compromised in the interest of short run cost savings. In addition, skills are an industry resource that also need to be actively nurtured. If they become too enterprise specific, the industry could lose its attractiveness to quality entry level trainees and skilled workers. Hence, to remain attractive, the metal industry more generally needs to offer the prospect of transferable skills and a variety of jobs in which they can be used. Such an outcome is unlikely unless careful effort is paid to maintaining coherent industry-wide classification and training arrangements.

The final workplace studied was a *specialised labour hire establishment* covering workers in the construction and metal trades. The manager of this workplace reported that the origins of labour hire in the engineering industry date from some of the specialised producers of machine tools hiring out their highly skilled workers when orders for output were low. Labour hire arrangements have subsequently taken on a life of their own and now work more generally to meet overflows in demand and to screen workers prior to permanent appointment. Despite his commitment to the labour hire industry, this manager did not support group training arrangements for apprentices. He argued that it was important that apprenticeships were recognised as involving the transition from adolescence to adulthood as much as they involved the transmission of technical skill. As such, ongoing, long term relations between an apprentice and a tradesperson were important for a quality training experience. He acknowledged that apprenticeship numbers were falling, and this was owing to the increasing economic uncertainty in the industry. Apprenticeships could, however, be made more attractive in the current situation by:

- providing something akin to a pre-apprenticeship during the final years of school
- providing a subsidy at the equivalent level of the dole for the first two years of the apprenticeship
- having the employer meet the full cost of the apprenticeship for the final two years of an indenture

Key challenges confronting the information technology industry

The IT industry is growing rapidly, and IT workers are now dispersed throughout all industries. Defining the training needs for such a diverse group of workers, in an environment where technology changes rapidly, has been a unique policy challenge for industry groups and training bodies. For IT professionals, especially those working in firms that are involved in the export of IT goods or services, it is imperative to develop training that is abreast of the constant changes to technology, products and systems. For the remaining bulk of IT workers who are not strictly employed in the IT industry, the problems associated

with training are different. Nevertheless many of these IT user firms have become increasingly exposed to global competition or are part of supply chains that are locked in to global markets. The strategic integration of IT into overall business strategy also means that organisations increasingly demand a high level of business knowledge from their IT experts. Interpersonal skills, marketing ability, customer focus, project management skills and general business knowledge are now often seen to be just as important as technical proficiency for IT workers in the competitive environment.

Describing the effect of globalisation on the IT industry depends on how the industry and its workers are characterised. The *direct* effects of globalisation can be observed by examining the experiences of computer companies and consultants who work in the production and development of IT technologies (products, software, hardware). This sector includes a mixture of small-to-medium-sized enterprises and very small operators and a number of large multinational corporations. The New South Wales Central Coast provides a case study of a region where a number of small computer firms and computer consultancies are emerging.

Globalisation also *indirectly* affects the way that IT services are managed, and the supply and availability of IT workers in all businesses. IT skills and IT departments are increasingly critical to business performance. The 1997 ABS *Business Use of Information Technology* survey found that almost *all* large businesses (those employing more than 100 people) have computers and that 46 per cent of small businesses have computers. Overall, almost half (49%) of all non-agricultural businesses in Australia have computers. In an environment where increasing competition and the pressures of globalisation are squeezing Australian businesses, IT has come to be seen as an essential element for improving efficiency and agility, particularly in those firms with a strong customer focus. The strategic place of IT in businesses has also meant that IT workers have new roles. IT managers now report a demand for staff with strong 'soft skills', balanced with high levels of up-to-date technical proficiency.

The South-West Sydney case study and some of the examples from the Central Coast provide examples of how globalisation affects IT indirectly—in two major ways. First, in response to the greater competitive pressures implied by greater exposure to global markets, governments and private sector businesses have increasingly moved to outsource their IT functions in an attempt to 'improve business performance'. Second, as a consequence of this trend, the demand for IT consultants and small IT contractors has grown. This has led to the further fragmentation of an already quite fragmented industry landscape.

There are three levels of IT evident in the industry on the Central Coast. Employment is spread across:

- 'low level' IT organisations that need data entry, processing and business administration skills
- 'medium level' IT firms that provide relatively routine PC and Network support and administration
- 'high level' IT firms that provide more specialised services in strategic IT consultancy, systems analysis and design and/or software analysis and design

There is significant diversity amongst the high level IT companies on the Central Coast, with a mix of both locally owned and multinational companies. Additionally, among these firms there is significant product differentiation, with some designing hardware, others software, some with a strong internet focus and others involved in the design of IT systems for large manufacturing organisations.

Globalisation impacts on the three levels of IT differently. In terms of low and medium level IT, globalisation has had little direct impact on competition or the supply of skilled labour. Certainly, lower end IT labour on the Central Coast is in oversupply, even though the same skills may be in demand in other regional areas. At the higher end, companies on the Central Coast generally reported that their main competitors were large Silicon Valley-based companies. However, while global competition existed in their general product market, the

products and services typically being designed on the Central Coast are highly specialised, and the niche market focus helped, to some degree, to isolate them from competition.

The highly specialised nature of these products has an impact on the skills required by these organisations. Generally, small and large high level IT companies on the Central Coast reported that they had difficulty finding people with the 'right' skills, and this was compounded by the specialist nature of the skills demanded. Smaller companies are compelled to train new employees in-house in their specific products and programs. Alternatively, these smaller companies will hire in skills for the duration of a project. The use of contract labour is very high, with up to half an organisation's labour being supplied by contract workers. Typically, these contractors do not receive the same level of training as permanent staff.

In contrast, larger high level IT companies, both local and multinational, had formal training structures in place, including training budgets and plans. These companies used a lower proportion of contract labour than the smaller companies and preferred to develop skills in-house rather than buy them in. The difference at the higher level of IT on the Central Coast is that larger companies tend to take a pro-active role in training, while the smaller companies only trained if time and resources permitted. Even then their training tended to be more reactive than pro-active.

In the South-West Sydney region, employment in IT tends to be concentrated in the medium level IT support roles (albeit often in relatively sophisticated ones involved in the networking and programming needs of multi-user systems).

Training that leads to formal qualifications does not seem to be a high priority among the South-West Sydney IT managers interviewed—with one exception. The *health and medical research institution* had a strong organisational philosophy to keep, train and develop staff on a permanent basis. The IT manager argued that this philosophy had developed because of the impact of globalisation. The market in IT skills is global, and staff with critical skills are in high demand. To challenge this trend, the organisation was trying to actively plan training needs, create opportunities for staff to develop necessary skills and stay with the business.

The other two large workplaces interviewed argued that globalisation has had a limited effect on the supply and quality of IT skills required for the needs of their businesses. Looking more closely, however, globalisation in this context has had an indirect effect. The *large financial institution* in our case study indicated that outsourcing had increased significantly in the last two years. One of the biggest factors contributing to this rise related to a merger with a larger multinational institution. In order to make the organisation more competitive, all departments had suffered budget cutbacks. The *large food and beverage sector workplace* had outsourced almost all of its IT functions because it was considered to be more cost effective. These increasing competitive pressures on businesses affect IT departments. IT systems are also coming under greater pressure to respond to the needs of users more quickly and efficiently. Making training a priority is evidently proving to be difficult when IT managers are pressured to work with increasingly lean budgets. As one IT training manager observed, 'training is often the most difficult part of a budget to justify in tough competitive times'. This pressure on IT managers and departments explains the value they place on workplace experience (especially *recent* workplace experience), rather than formal vocational qualifications. As one IT manager commented, 'it is essential that a new worker be productive from day one on the job'.

Local training providers have attempted to address some of the concerns raised by IT managers by developing short courses and greater options for part-time study. However, the lack of communication between providers and users means that employers are not generally aware of the courses available. This explains (in part) their reliance on vendor training, despite displeasure with its limited focus. Vendor training is easy to access and is delivered quickly.

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The two small firms interviewed for the South-West Sydney case study have been beneficiaries of the growth in outsourcing. Both firms were supplying services to local businesses that did not consider it cost-effective to have their own IT departments. Both of these small businesses were responding to a perceived need in the region—a need for IT support services, help-desk functions and programming consultants. Both of the small firms interviewed largely relied on contracted IT specialists to perform this work. These contractors worked as freelance professionals, often working on contracts for more than one company at a time.

In this way, the fragmentation of much of the IT industry into numerous small firms comes to be replicated in the fragmentation of the labour market. Many organisations in both regions employ a large number of contractors who tend to move readily between contracts and workplaces.

Why the emerging industry training markets are failing to meet the key challenges arising from globalisation

While both the metals and engineering and IT industries confront key challenges that are related to, or derived from, globalisation, the precise character of those challenges differs in each case. As a result of that, and because of the obvious differences in the training traditions, employment demands and organisational and management styles of the two industries, the particular training and skills development problems encountered in each industry differ. Nevertheless the character and nature of many of the most significant problems are similar in both industries.

Training and skills problems in the metals and engineering industry

In metals and engineering the training and skills problems include:

- *Increasing competitive pressure is exacerbating employers' traditional failure to sufficiently commit to training investment and skills development*:

  While there are several reasons for this, the most apparent include increasing pressures to reduce and keep labour costs low, uncertainty about short, medium and long term prospects and the increasing use of outsourcing and labour hire firms for skilled functions. All these pressures are increasing as levels of protection drop and import levels increase. Global sourcing strategies of multinational corporations and opportunities for licensing arrangements emerging in developing and newly industrialised economies partly offset the negative consequences of increasing economic integration. The new demand for output is, however, more volatile and more difficult to monitor than under the situation which prevailed previously in the industry—that is, import substitution. In the past, local producers engaged in intense competition for a slice of the protected domestic market. This resulted in a fragmented industry structure. This structure is ill equipped to cope with the threats of falling protection and the opportunities offered by switching from import substitution to export. Challenges concerning the industry's failure to capture the benefits of co-ordination in training are symptomatic of the industry's wider problems of adapting to a new economic environment.

- *Employers' lack of knowledge of:*
  - the opportunities presented by competency-based training and assessment reforms
  - the means by which competency-based training and assessment can be introduced in their workplace
  - the flexibility of the new training packages

- the means by which group training companies, networks and co-operative schemes can be used to assist in supporting training:

While employers tend to be positively predisposed to the theory and potential practice of competency-based training and assessment, very few have made substantial progress in the meaningful implementation of competencies at the workplace level. It is typically seen by employers as too difficult, costly and complex. Knowledge of how the reforms can be introduced at the workplace level is not well diffused. Similarly, the detail and potential advantages of the new training packages are not well understood by employers. Admittedly, these problems are most pronounced in New South Wales, the State where all our case studies were conducted. However, our discussions with interstate key informants suggest that Queensland is one of the only States where competency-based training and new packaging arrangements are making a pronounced impact.

- *Employers' tendency to attempt to recruit already skilled workers, or buy in skills from labour hire firms, rather than take on apprentices and trainees, or train and develop the skills of existing or new employees*:

The traditional training culture in metals is under threat. In large part this particular problem appears to be exacerbated by the failure, rationalisation, restructuring or re-orientation of many large employers who were historically the major trainers of apprentices. Some evidence presented also indicated that the increasing use of labour hire firms was also a factor; as firms outsource functions they reduce their need for particular skilled trades workers and thus reduce the need or rationale for apprentices. Many informants claimed that labour hire firms were far less likely to train because of the tighter margins under which they operated.

- *The prospect of existing skills shortages and skill gaps becoming much worse as the combined effects of declining apprenticeship numbers, less formal structured training and the outsourcing of many skilled functions impact on the labour market*:

Skill shortages and gaps presently constitute an occasional problem for some employers rather than a major problem for most employers. Nevertheless there is a concern that future growth will be likely to be constrained by shortages and gaps. Some suggested that the present capacity of the industry to pursue large-scale contracts on global markets is being hampered by a lack of co-ordination in the training of certain specialist skills, particularly in machining, toolmaking and fabrication.

- *Some difficulties in attracting high quality school leavers to undertake apprenticeships*:

The public image of the industry, and of manufacturing more generally, is poor. School leavers are not readily attracted to the industry. Parents and school careers advisers, aware of the downsizing in the industry throughout the 1980s and early 1990s, are disinclined to promote it as a viable career option for school leavers.

- *The range and relevance of available courses, modules, programs and training in various competencies is more a theoretical than a practical reality*:

The industry has over 280 units of competency and approximately 1000 modules that can be used for training. Packaging arrangements now mean that employers and employees can theoretically get exactly the course of training that they want and that it is 'workplace relevant'. While this is exactly what employers say they want—flexible and relevant training—many of those kinds of training options are often not available in practice. Moreover, an excessively tight fit between workplace requirements and skill development can reduce the transferability of skills.

- *Technical and further education's (TAFE) lack of resource capacity to have adequate numbers of field officers, industry liaison officers or others with teaching experience devoted to communicating with industry*:

TAFE has long been accused of lacking an industry focus. The quality of TAFE instruction is well regarded and many TAFE colleges are improving their industry liaison capacities. These initiatives are generally *ad hoc*, however, because TAFE colleges typically lack the resources to fully commit to a permanent program of liaison and promotion with industry. Their primary function is training provision, not brokering the match between employers' and workers' demands for skill formation and the providers of that training.

Training and skills problems in information technology

In IT the training and skills problems include:

- *Employers' failure to sufficiently commit to training investment and skills development:*

  The IT industry is characterised by short product life cycles and rapid technological change. While this of itself suggests the need for regular training to ensure the continuing relevance of skills, there are a number of industry-specific factors which militate against a strong training commitment amongst many employers. First, there is a comparatively weak tradition amongst IT employers for employer-sponsored training. IT employees are often expected to have acquired the necessary skills themselves or be prepared to self-teach. Second, many IT skills that are valued by employers are problem-solving skills that some believe can only be acquired by the individual on the job. Third, many parts of the IT industry are involved in globalised product or service markets where they compete for work or for sales with overseas providers, or they are dependent suppliers to other producers or providers who are in those markets. As a result, many IT employers confront the same intense competitive pressures that have tended to place pressure on labour costs in other global industries. Fourth, many IT employers of medium and high end skills are small enterprises and claim that the costs and disruptions associated with off-the-job training act as a significant disincentive.

- *Employers' lack of knowledge of:*

  - the amount and type of training they require
  - the opportunities presented by competency-based training and assessment reforms
  - the means by which competency-based training and assessment can be introduced in their workplace
  - the flexibility of the new training packages
  - the means by which group training companies, networks and co-operative schemes can be used to assist in supporting training:

  Associated with the industry view that many (particularly high end) IT skills are based on problem solving, idiosyncratic or product and application-specific abilities is a traditional lack of attention to formal skills audits and a scepticism that IT skills can be 'reduced' to specific discrete competencies. A very narrow, task-based approach to competency-based training does have some tradition in IT, however, in the sense that vendor-provided training tends to be very product and application specific and credentials purport to guarantee the competency of the trainee to use that specific software. Most IT employers, however, tend to have little experience with a structure of competencies that are, essentially, not product specific.

  Employers of lower end IT users are much more receptive to the ideas of competency-based training and assessment and skills audits and some large companies are moving toward networks and other co-operative schemes.

- *Employers' tendency to attempt to recruit already skilled workers, or hire consultants or contract workers with the particular skills, rather than take on apprentices and trainees, or train and develop the skills of existing or new employees:*

Not only are many IT firms involved in global markets, many are exposed to a global labour market. Highly skilled employees in particular have access to an international labour market. Vendor-training credentials, for example, are recognised worldwide. This means that employers will sometimes have the option of importing skills as an alternative to training. Labour turnover in IT tends to be relatively high, even where workers are employees rather than contractors. Short work tenures create a strong disincentive for many employers to train.

For lower end IT user employers, the disincentives to train operate differently. Here there are typically few skill shortages or skill gaps, and the supply of appropriately skilled labour is relatively plentiful and relatively inexpensive.

- *General and specific skill shortages in medium and high level IT*:

  Dramatic claims as to the extent of general and specific skill shortages in IT have been made by some of the leading industry associations. The Australian Information Industries Association has claimed that there is a current shortage of 30 000 IT workers in Australia and has warned that this shortage is bound to increase in the short term. Shortages across a range of specific skills are routinely identified in the skills vacancy surveys. Employers interviewed for this study did not report skill shortages of the severity that was expected; however, there is little doubt that there are significant skill shortages across the industry.

- *Private, vendor-provided or certified training tends to be relatively expensive, product specific and relatively technical*:

  The cost of private courses remains a concern for many employers and has obvious implications for access where industry job-seekers are funding their own training. By its nature the training is specific to a particular software program, application or environment. This affects the portability of qualifications and the applicability of skills in different settings. Employers, employees and some training providers express concerns that the training is highly technical. This training does little to alleviate the widespread concern that trainees are poorly equipped in a range of 'soft skills' and more general business skills in project management, marketing and customer or client service. There is also evidence amongst some trainees and employees that the quality and value of some of the training is dubious.

- *TAFE-provided courses do not enjoy strong industry support or widespread recognition amongst employers of medium and high end IT skills*:

  Despite the availability of a wide range of TAFE IT courses and their popularity, there continues to be a pervasive view across the IT industry that TAFE training is inferior to vendor training. This is the case even though TAFE courses evidently have the capacity to produce graduates with strong 'soft skills' and business skills as well as highly portable technical skills. Employers have become accustomed to relying on vendor training and vendor credentials, and despite their claims to be prepared to support TAFE training, there has not generally been strong demand from employers for TAFE courses.

- *There is a general lack of co-ordination between training providers and employers*:

  Industry representation in the development of the IT training package has not apparently succeeded in developing a package that will enjoy strong industry usage. Skill shortages remain, although there is doubt about their severity. Student and job-seeker demand for IT training is relatively high and growing. Employers have an obvious need for a better training provision and employees who have received more rounded training. This all indicates that the level of communication between industry and training providers is inadequate and that improved co-ordination between training demand and supply is needed.

Our analysis of the fieldwork data and our conclusions drawn from our discussions and interviews with many key informants from across the metals and IT industry training markets strongly suggest that the emerging training markets in both industries are not adequately

responding to these challenges. It is also very unlikely that further marketisation of industry training, or more deregulation of existing arrangements, will succeed in encouraging more constructive responses, or solutions to these problems.

As noted in our analysis of recent training policy reforms in volume 2, the development of a training market is meant to increase the choice, relevance and cost effectiveness of training provision. In both industry settings there is substantial evidence that this is not occurring.

The metals and engineering training market

Despite the flexible content of courses under the new packaging arrangements, the capacity of employers, trainees and apprentices to access workplace relevant courses is constrained by several factors. First, TAFE colleges are limited by the practicalities of teacher availability and class sizes in the number of courses, modules and competencies in which they can provide training. Second, private providers are not apparently responding to these needs because of the technical complexity, cost, and speciality of many of the courses, modules and competencies. Third, there is a widespread perception in the metals industry that behind the marketisation push lies a determination by government to withdraw from the public funding of VET, other than minimal entry level training. This suspicion is feeding a lack of confidence in the direction of training reforms and a belief that there is little public support for the industry's desire to secure the level of skill development required to compete in global markets.

Further marketisation of training in metals and engineering will fail to address these problems. The problem of 'thin markets' is already apparent. There is little evidence from our case studies or from the views expressed by key informants that private providers are able to provide the wide range of training in technical skills demanded by the industry. Further exposure of TAFE to 'market discipline' will probably result in a further contraction of the range of available training, a further restriction in its accessibility and a reduction in its quality.

The information technology training market

The existence of private and public providers also purports to provide greater training choice in IT. Here, however, the industry training market is also failing to meet the challenges of the industry. There are concerns over the cost, breadth and portability of private vendor-provided and licensed training. Yet TAFE training is having difficulty in gaining industry acceptance, and reservations remain about the practical applied competency of many university graduates. There is industry alarm about skill shortages yet there appears to be an ample supply of job-seekers who need training and no shortage of training providers.

Despite an apparent industry preference for private-training provision, further marketisation is unlikely to be the answer in the IT industry either. The existing industry training market is failing to match supply and demand. At the low end and medium level of the market, TAFE is competing with private providers, and while its training is more affordable for trainees, it is not securing strong industry acceptance. The market is operating so as to distribute the positional goods of VET qualifications inequitably. (Educational qualifications can be considered 'positional goods' because their allocation contributes critically to the social and economic position of people within society.) Further marketisation would aggravate rather than alleviate this situation. At the high end of the market there is choice, provided the firm or individual is prepared to pay a premium. The market appears to be dominated by vendor training that fails to articulate with the broader and more generic training that is offered by TAFE.

Given the challenges of globalisation and the problems in the industry training markets, there is an obvious need for employers in both industries to better harness the positive externalities to be gained from co-ordination and co-operation. It is apparent that a much more focussed institutional structure is required if better training is to result.

A number of the key examples of successful and innovative initiatives discussed in the case studies reported in the appendix represent imaginative solutions to these problems of poor co-ordination. They include formal and informal structures organised on a regional and industry basis that have succeeded in facilitating better information flows, improving the co-ordination of training demands and training provision and sharing the burdens and costs of training.

Current training reforms need to extend beyond the facilitation of industry training markets. In particular, future reform needs to build on previous initiatives to establish new mediating structures that enhance co-ordination between all the elements of these industries' skill formation systems. Trying to make the industry training markets 'work better' will not address the key challenges identified above. Rather, if the potential of previous reforms is to be realised closer attention needs to be given to developing new mechanisms of co-ordination at industry, and especially regional, level.

In the next section we synthesise our findings with respect to the implementation of competency-based training and assessment, the introduction of New Apprenticeships and the new training packages in both industries. To date these initiatives have had limited impact at the workplace level. The potential benefits they offer are real. Consideration of these initiatives provides a concrete example of the limitations of the current approach to VET reform. They also offer the opportunity to consider how they might work if more effective co-ordination and brokerage arrangements were established.

The implementation of competencies, New Apprenticeships and the training packages

Competency-based training and assessment and the flexibility designed to be central to the new packaging arrangements for training offer the promise of significant improvements to the delivery and use of VET in Australia. Competencies and the training packages can make a major contribution to the quality, accessibility and attractiveness of training in both metals and IT. However, on the basis of our case studies, interviews and other research undertaken for this project we conclude that the substantial promise of these reforms has not been fully realised. The failure of the industry training market approach to reform to meet the challenges of globalisation (at least for metals and IT industries) remains the major problem identified in this project. However, there are a series of problems associated with the implementation of competency-based training and assessment, New Apprenticeships and the training packages that are also important.

The problems associated with the implementation of the reforms in the two industries featured very prominently in many of the discussions undertaken as part of our fieldwork. Importantly, many of these problems also turn on the inadequacy of current arrangements and institutions that might facilitate information flow, co-ordination and encourage the sharing of the burdens of implementation.

Problems with competency-based training, New Apprenticeships and the training packages in metals and engineering

- *The full implementation of competency-based training and assessment has proven to be too difficult for most workplaces:*

  Our investigation of the extent of implementation of competency standards in metals workplaces in New South Wales reveals that very few have succeeded. Most employers and key informants argued that the task of implementation has simply been beyond the capacity of many organisations. While many employers conceded that the system had advantages, they typically cited other higher priorities, the cost of full implementation

and the lack of assistance as the major reasons for failure. Those that have succeeded in substantial implementation have normally shared certain features. For example:

- they are often large employers with a personnel or human resources division or team
- they tend to have secured funding or external assistance to develop competency standards
- they have had strong management support for implementation
- they have been prepared to adapt the structure to suit their particular business conditions
- they have tended to introduce competencies as part of more fundamental changes to work practices and work organisation

❖ *Workplaces are generally poorly prepared to accommodate the workplace focus that is an integral feature of the adoption of the new training package*:

The new metal and engineering training package envisages the development of training programs that are appropriate to the particular conditions of specific workplaces. The requirements of assessment of competencies in many cases imply the need for workplace-based assessment. The vast majority of workplaces in the industry are unaware of these requirements and are likely to encounter difficulties in providing the time, opportunities and resources required for course development and the organisation of assessment (the presence of either a trained workplace assessor or TAFE teacher; completion of weekly work logs by supervisors; submission of paperwork; quality assurance of workplace assessments). Workplace-based assessment may be feasible for apprentices working in large workplaces with the necessary range of equipment and work tasks; however, it creates massive problems for those employed in smaller or more specialised work environments, and for those who are undertaking training but who are not employed in the sort of workplace which performs the work in which they are being trained. Proposals that simulations may be able to be substituted for actual workplace assessments are unlikely to be adequate or superior to previous assessment arrangements.

❖ *Employers and some training providers suspect that the training that will occur under the new packages will not be coherent*:

While flexibility is the key to the appeal of the new packages, concerns were raised in light of the recognition that most workplaces will not be able to define or access the flexible training courses they may need. It is feared that TAFE will therefore provide the courses, and training in competencies, based on the curriculum, materials, equipment and teachers that they happen to have available. This problem of the possible incoherence of resulting training courses is exacerbated by the structure of the package which has a relatively small foundation, a small core and a large and flexible specialisation component. Within level 3 qualifications, for example, only 40 of 96 points must come from the specialisation area, and within that area there are numerous possible permutations of specific competencies that can be counted. (In the fabrication stream, for example, there are over 300 points worth of competency units from which the 40 can be drawn.) Of even greater concern is the range of currently existing course units that can be used to train in a particular competency; typically the units are very diverse and involve the execution of the competency skill in very different production contexts. This inconsistency in the actual content of any given set of acquired competencies will adversely effect the portability of skills.

❖ *The New Apprenticeships scheme may be pulling resources away from the training of existing employees in metals*:

There is a widespread view within the industry that the proliferation of new apprenticeships in areas such as the small business traineeship and the administration traineeship is drawing support away from key areas of metals training. For example, most State Governments have recently moved to control the number of n(on account of their

rapid growth in services) by limiting them to new employees only. This raises concerns in the industry about the provision of training to existing employees.

- *The competency-based system has established a full range of qualifications, but there remains limited demand for lower level training*:

  The introduction of the Certificate II in Engineering Production (EPC) held the promise of providing production and process workers with access to better recognition of their skills and a potential, structured pathway to trade level certification. The EPC has not proven to be as popular as was once hoped. While it is difficult to ascertain the reasons for this failure, it appears that there is significant employer indifference to the formalised training of their production workers in line with the Australian Qualifications Framework (AQF). It is likely that the shift since the late 1980s from award restructuring to enterprise bargaining has contributed to this dampening of employer enthusiasm for the provision of structured training pathways for lower level employees. This is not to say that production workers are not receiving training but that their training is not facilitating portability or the development of a career path.

Problems with competency-based training, New Apprenticeships and the training packages in information technology

- *Employers and private providers are sceptical of the applicability of competencies in IT training*:

  IT employers and training providers are acutely aware of the pace of change in IT and its effects on IT training. In the view of many, much training is out of date in six to twelve months. Employers and private providers reported considerable scepticism that any training system based on a series of identified and specified competencies could ever be appropriate in such a fluid skills environment. An alternative but associated view common in the industry is that IT skills can only be understood and developed in the context of specific applications in a specific environment. This implies that all training must be done on the job and that these holistic skills cannot be divided into specific competencies without being misconceived.

- *Many of the units of competency contained in the IT and administration training packages are seen by employers and some training providers as too vague*:

  Associated with the above view that IT skills are product and environment specific is the view that the resulting competencies do not describe skills in sufficient detail and that those competencies may mean very different things in practice depending on the program, operating system and actual application within an organisation. Some training providers and mediating institutions also expressed the view that the competencies in the administration training package were very vague and general.

- *Where competency-based training and assessment has been used it has often been used for reasons other than improving training quality or delivery*:

  In high and medium level IT sectors competencies have been used by some employers but not necessarily as a means of developing training pathways for employees. On the contrary, many have used the competencies as a means for undertaking an assessment of skills for the purpose of performance appraisals. Competency standards are being interpreted by some employers as benchmarks against which to measure their organisation's skill profile and the skills of particular employees. This suggests a lack of effective communication concerning the rationale behind competency-based training and assessment. Nevertheless it may have the potential to assist employers in better identifying skill gaps and shortages.

- *New apprenticeships are sometimes seen and treated as employer subsidies rather than as commitments to training*:

  A number of key informants suggested that some new apprenticeships were seen by some employers simply as a subsidy to employ an inexperienced or even experienced worker rather than as a training program. While this allegation has been most regularly made in connection with the popular small business traineeships, it was also suggested that many administration apprenticeships and traineeships and some IT apprenticeships and traineeships did not involve a serious commitment to training but were simply registered for the purpose of attracting the subsidies and financial incentives.

- *The IT training packages may not articulate satisfactorily with vendor-provided and licensed training*:

  The development of the IT training package attempted to ensure that it would be possible to integrate private vendor training with training in other competencies that would be provided by, for example, TAFE or another generalist registered training organisation (RTO). There is widespread doubt in industry and amongst private and public providers that this can readily be achieved. Certainly the process of matching vendor-training content against competency standards, and then identifying and accessing supplementary training that together will constitute a qualification within the AQF, appears far from straightforward. Initiatives such as the development of an Australian version of the International Computing Drivers' Licence may assist provided they are developed in direct collaboration with TAFE and the Communications ITAB unit responsible for the design of the IT training package. Otherwise these initiatives have the potential to further fragment an already highly fragmented industry training market.

- *The possibility of employers and trainees undertaking training programs that fully utilise the flexibility available under the packaging arrangements is being frustrated by the absence of satisfactory institutions to assist in the design of those programs*:

  Evidence presented to us indicated that the New Apprenticeships centres were generally unable to provide the degree of specialist advice required to direct potential trainees or employers to training package designs that would meet their needs. This failure is exacerbating a number of the problems associated with the present performance of the industry training market such as skill shortages and skill gaps and trainee uncertainty about what training should be undertaken.

Conclusions: The need for better co-ordination and communication structures across the industry training markets

This synthesis report has identified a series of major challenges associated with the processes of globalisation and a series of problems associated with the implementation of some of the most significant dimensions of recent training policy reforms. Our research indicates that while industry training markets may have advantages, the policy of cultivating those markets in the context of Australian VET practices is failing to meet the urgent challenges confronting the IT and metals industries.

While the challenges of globalisation and the problems of reform implementation are very different, and while they impact very differently in each industry, our analysis of the issues and our fieldwork research point to the need for better co-ordination structures across both industry training markets. These industry training markets appear to be impeding rather than facilitating efficient, effective and high quality training delivery. Markets require institutional support to ensure their effectiveness. Markets in positional goods require careful regulation and third-party involvement to ensure their allocative function works with some degree of equity and efficiency.

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The industry training markets examined in this report require enhanced institutional support, careful regulation and involvement of mediating institutions. In particular, the training markets suffer from a lack of co-ordination. In both IT and metals, there are problems of matching demand and supply. In IT, there are claims of severe skill shortages yet there are thousands of young people wanting training in the industry. In metals, shortages of boilermakers are often reported yet TAFE colleges have been making teachers of these skills redundant.

A range of more dynamic and effective mechanisms is required if the co-ordination problems are to be overcome. There are a number of points where improved co-ordination is desperately needed. In both metals and engineering and IT communication and links between the training demands of employers, the training needs of employees and the training supply provided by training organisations are quite underdeveloped. Brokers are needed to put employers in touch with providers, offering advice on the way in which training programs can be designed and ensuring that employers and trainees receive the quality training they need to develop relevant skills.

A 'one size fits all' approach is unlikely to succeed. Instead, closer attention needs to be devoted to the specific problems confronting particular industries. For example, in IT there is clearly a need for improved co-ordination between the TAFE colleges and the vendors. Mechanisms must be found to ensure that vendor training can be fully integrated with TAFE training and that both fit effectively within the qualifications framework.

Overall this analysis reveals that while recent training reform initiatives have the potential to assist employers to meet the emerging challenges of globalisation, little of this potential is being realised. Our conclusion is that the problem is not simply one of inadequate or deficient implementation. Rather, the challenge is much deeper: it concerns system design. Many of the reforms surrounding the push to an industry training market assume that price is capable of providing an adequate and efficient co-ordinating mechanism. Our fieldwork reveals that too much is expected of this mechanism. Whilst it can play a role, it needs to be supported by a range of more dynamic and effective mechanisms. The key challenges facing the industries examined arise from the extensive fragmentation that characterises the relations amongst the enterprises within them. The subsequent co-ordination 'failures' mean that potential positive externalities, such as those associated with capturing the benefits of scale economies, are not realised. As the International Labour Organisation (ILO) has noted in a recent report on the machinery, electrical and electronic industries, one of the key challenges of the future concerns 'the problem of co-ordinating flexible production systems' (ILO 1998, p.138). These problems do not just concern training issues. Co-ordination failures between enterprises within an industry sector mean that major commercial opportunities are being missed overseas. As such, reforms to vocational education need to be located within the context of a wider framework of business development geared to achieving success in a globalising economy.

One of the most promising developments in this regard has been a proposal to develop a centre for toolmaking in South-West Sydney. This facility, proposed to be known as Austool, would provide support to a range of areas. These include research and development, marketing and product testing prior to despatch overseas. A group-training scheme is also part of the proposal. But training is not handled as a separate issue; rather it is a key component of an *integrated industry response* to the challenges and opportunities arising from globalisation in the metal trades.

Unless training reform pays closer attention to the business realities of success in an increasingly globalised economy, it is likely to hinder rather than help Australian firms to meet the competitive challenges of our times. Successful mechanisms tend to be regional and industry specific. They enjoy the active participation of firms often in a network or co-operative arrangement. They allow training needs and burdens to be shared. They deserve close scrutiny and active government support.

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Appendix: Regional industry training market case studies

The labour market in the Hunter region

The Hunter Valley region is defined here as including Newcastle, Cessnock, Maitland, Singleton, Muswellbrook and surrounding areas. Data is drawn from both the 1996 Census data as well as the 1999 Report for the Hunter Area Consultative Committee of the Department of Employment, Workplace Relations and Small Business compiled by the University of Newcastle's Employment Studies Centre (ESC) (1999) and the Hunter Valley Research Foundation. This report provides an outstandingly rich overview of the labour market and skills in the region and is relied on heavily in this section of the report.

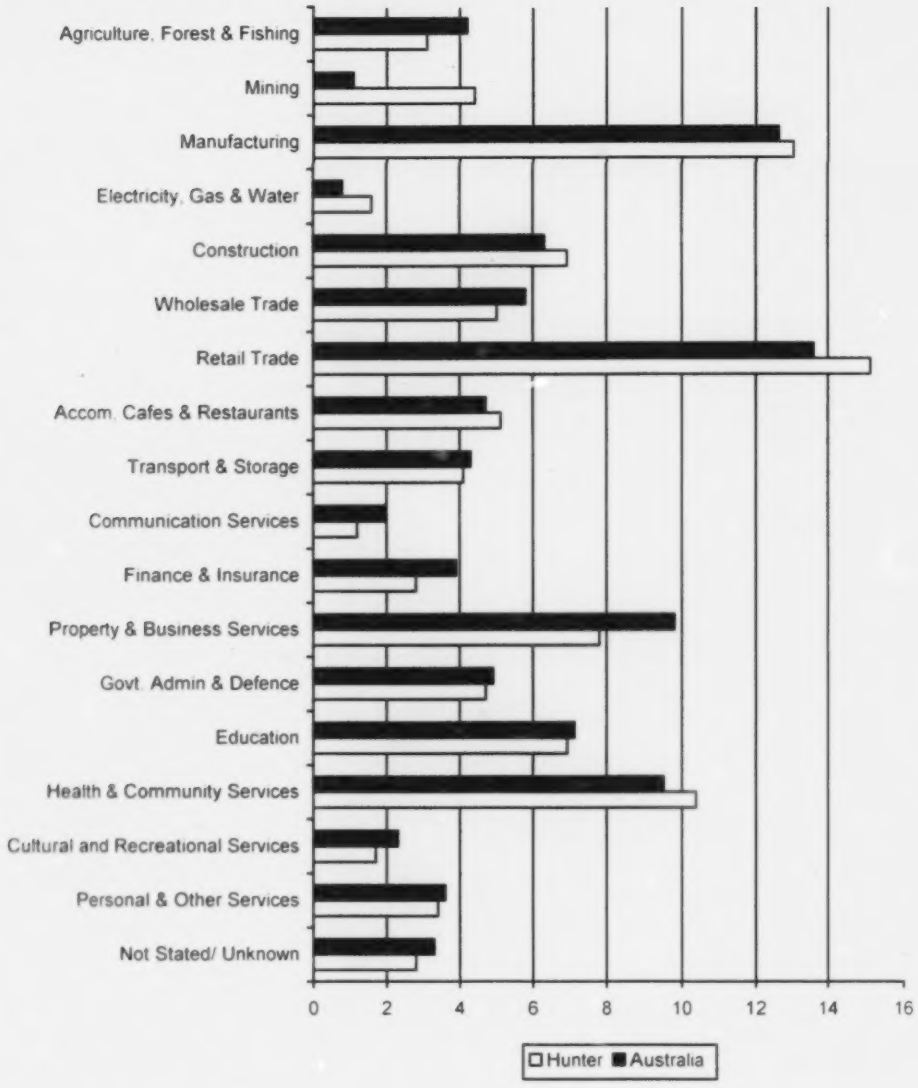
As with many other regions in Australia, the Hunter Valley's employment profile and circumstances have undergone major changes and weathered major challenges over the past 15 years. However, the region has suffered the effects of industrial restructuring and rationalisation more dramatically than most owing to its traditionally strong mining, metals and engineering, and agricultural sectors.

Unemployment remains a major problem in the region, with the Hunter's average rate continuing to stay above the national and State averages. Male participation rates have been declining slowly, although there has been a marked increase in the female participation rate in the Hunter, as elsewhere in Australia, since 1981.

Despite the tough times that have hit the Hunter, there are some positive signs in the underlying labour market fundamentals. Despite ongoing uncertainty about the future of the region's big industries and traditional strengths, the region has recovered from the recession of the early 1990s with a greater number of more robust, internationally competitive firms. Total employment has grown by five per cent since 1991 and by more than 15 per cent since 1981 (ESC 1999, p.38). The region has been upskilling and improving its educational profile with a continuous improvement in the number of people with tertiary educational qualifications and trade qualifications. A significant number of firms express an intention to increase the number of apprentices and trainees in the future, even though their expenditure on training has been declining in recent times.

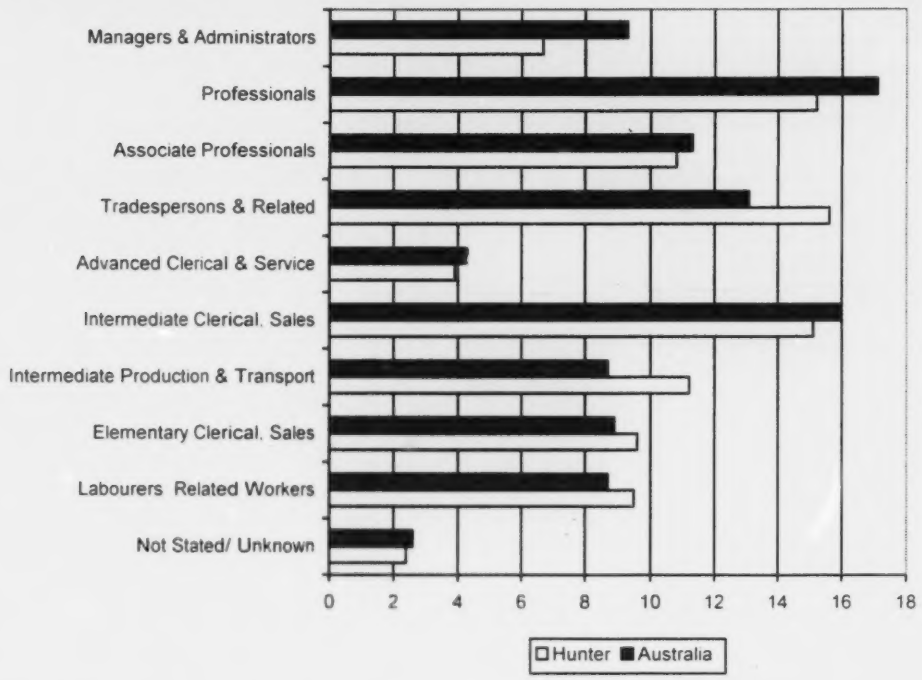
Clearly the region's predicament presents some critical challenges for training policy and the emerging training market. Many of the labour conditions in the Hunter militate against the likelihood of increasing private sector expenditure on training, especially in the metals and engineering sector—firms and workplaces are becoming smaller, market conditions are becoming less stable, competitive pressures are intensifying, the use of contractors, part-timers, casuals and outsourcing continues to grow.

Figure 1: Employment in industries as a percentage of total employment, Australia and the Hunter, 1996



Source: ABS Census of Population and Housing (1996)

Figure 2: Employment in occupations as a percentage of total employment, Australia and the Hunter, 1996



Source: ABS Census of Population and Housing (1996)

Changes to the employment structure

The general shift from manufacturing to services that has been occurring across the Australian economy over recent decades has occurred in the Hunter as well. However, it has not simply been a case of all types of manufacturing jobs disappearing and being replaced by a wide variety of service sector jobs. The region has seen a quite dramatic increase in the number employed in the accommodation, cafes and restaurants sub-sector and continued strong growth in the retail trade sector. These trends seem to correspond with the Hunter's determination in recent years to promote itself strongly as a tourist destination. The old wholesale and retail trade categories (which used to include the new category of accommodation, cafe and restaurants) have shown employment growth of over 20 per cent in the past five years (ESC 1999, p.44). Absolute and relative levels of employment in manufacturing *have* declined since 1986 but they have increased in absolute terms since the 1991 census. The ESC Report for the Hunter Area Consultative Committee argues that services employment *has not* been at the expense of manufacturing jobs, and notes that 'manufacturing jobs have increased if the services are counted which support manufacturing or which have been outsourced, such as engineers, technicians and other business services' (ESC 1999, p.47).

Taking a closer look at employment in metals and engineering in the Hunter reveals the changing composition of manufacturing in the Hunter. The most significant trend has been a shift in employment from basic metals processing to metal fabrication and transport equipment manufacturing over the five years 1991–1996. This is a positive development within the metals labour market in the sense that metals fabrication and equipment manufacturers tend to be much stronger employers of high skill trades. They are also more likely to be small to medium-sized enterprises (SMEs). According to the ESC this 'reflects the growth of dynamic, export oriented small and medium enterprises in the metal and

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engineering sector, with high value-adding products and processes, whose continued growth is vital to the region' (1999, p.49).

The move of at least some manufacturing employment from large scale metals processing, such as steelworks, to smaller scale, niche market metal fabricators and engineering shops poses some interesting issues for training in the region. All things being equal, the training demands of the region should be increasing but becoming more specialised and firm specific.

The ESC Report also identified the ten fastest growing and most quickly declining jobs for men and women for the ten years since 1986. The occupational lists bear out the kinds of manufacturing jobs which have been in decline and the new services opportunities.

Table 1: Top ten growth and declining occupations for males and females in the Hunter region 1986–1996

Top ten growth occupations		Top ten declining occupations	
Males	**Females**	**Males**	**Females**
Sales representatives	Sales assistants	Mobile constr'n plant operators	Switchboard operators
Project & program administrators	Receptionists	Metal fitters and machinists	Keyboard operators
Miners	General clerks	Other int. stationary plant operators	Sewing machinists
Defence force n.e.i.	Secretaries and personal assist's	Construction and plumbers assist's	Mail sorting clerks
Livestock farmers	Children's care workers	Electricians	Messengers
Computing professionals	Registered nurses	Mixed crop and livestock farmers	Mixed crop and livestock farmers
Sales assistants	Waiters	Delivery drivers	Textile, footwear machine operators
Checkout operators	Special care workers	Crane, hoist and lift operators	Other food factory hands
Production managers	Bank workers	Communications tradespersons	Crop farmers
Kitchenhands	Cleaners	Crop farmers	Other process workers

Source: ESC (1999), pp.53–55

Note: Occupational Categories are disaggregated to Australian Standard Classification of Occupations four-digit level. Occupations are listed in order of magnitude of increase or decline

It should be noted that if the list were compiled today, miners would be unlikely to appear on the growth jobs list in light of the massive retrenchments which have taken place over the past two years. None of the other 'growth occupations' could be considered as within metals and engineering, with the possible exception of some of the 'production managers' or some of the services jobs that may be located in the manufacturing industry. On the other hand, one of the traditional core metals industry occupations, fitters and machinists, was the second fastest declining occupation in the Hunter in the period 1986–1996.

As noted above, unemployment continues to be a major problem for the Hunter region. The 1996 Census reveals an unemployment rate of 11.3 per cent. Current unemployment levels in the region tend to be approximately three per cent higher than for the nation as a whole. The rate of youth unemployment is estimated to be approximately 20 per cent. Almost 80 per cent of employed young people work in retail trade and while for many this constitutes part-time or casual work while studying, for many others it suggests limited long term advancement. Nevertheless manufacturing is the second most common industry of employment for 15–19-year-old males in the Hunter (ESC 1999, p.43).

Training trends

Data collected by the ESC as part of its survey of Hunter workplaces conducted in 1995 and again in 1998 indicate the existence of skill shortages in the Hunter, despite continuing high unemployment in the region. Manufacturing workplaces (42%) were more likely than average (39%) to report some difficulties in recruiting certain categories of employees—in their case the most commonly mentioned examples were electricians, fitters and some specialist tradespeople. A number of occupational categories central to metals and engineering were mentioned when respondents were asked what skill shortages they anticipated in the near future. Boilermakers, sheet metal workers and fitters were identified by Hunter workplaces as being difficult to recruit in the short term (ESC 1999, p.89).

Despite some difficulties for employers in securing the skilled metals employees they need, expenditure on training as a percentage of payroll declined between 1995 and 1998. As has been the case nationally, formal, structured training has been declining in favour of a greater reliance on informal, on-the-job training (ESC 1999, p.96). A broader range of training providers is now being used by Hunter workplaces. In manufacturing over 90 per cent use their own personnel to deliver training, just over 50 per cent use technical and further education (TAFE), a little under 50 per cent have used at least one training consultant and around ten per cent reported using a university. The report estimates that there are approximately 200 private training providers and consultants in the Hunter (ESC 1999, p.99). While all this might be taken to indicate a healthy private training market, the training provider data gives no indication how many, or which workers, get access to training provided by private consultants.

The overall proportion of Hunter workplaces offering apprenticeships or traineeships has dropped slightly since 1995 (ESC 1999, p.100). This is a particularly worrying statistic in light of the major drive to increase traineeships through the new apprenticeships scheme over this period. As might be expected, the proportion of workplaces offering at least one apprenticeship was highest in the manufacturing sector, but even here less than 40 per cent of workplaces had an apprentice. There is some evidence of a degree of pessimism amongst employers with respect to apprenticeships, with just on five per cent anticipating putting on a new apprentice in the coming 12 months. (By comparison 21 per cent of workplaces interviewed in the 1995 survey anticipated putting on an apprentice or trainee in the near future.) Ten per cent of manufacturing workplaces thought they were likely to employ a new apprentice in the coming year, and when asked in what field the apprenticeship would be, metals and engineering trades featured strongly (ESC 1999, pp.101–102).

The ESC's workplace survey data also provides an insight into the reasons why more employers in the Hunter are not taking on more apprentices or trainees. Almost all employers stated that they were aware of the financial incentives provided by government to employ an apprentice or trainee; however, only a minority of them took advantage of those subsidies. The two most commonly mentioned reasons for employers not taking on an apprentice or trainee were the cost associated with taking on an apprentice or trainee and concerns with the work attitude of an apprentice or trainee (ESC 1999, p.103). Given that apprentices and trainees command lower pay rates than other recruits, the cost fear is likely to be associated with concerns relating to administration costs, training costs, lower productivity and/or disruption to the workplace. Concerns over apprentice or trainee quality may reflect anxieties surrounding the employment of inexperienced or young employees or may be sourced in a previous bad experience.

Most employers in the Hunter report overall satisfaction with the training available in their industry; however, manufacturing employers tend to be a little more likely to rate training as 'poor' than other employers. The most commonly cited reasons for dissatisfaction are the relevance of that training (22% of workplaces) and the amount of training that is available (18%). Interestingly, very few workplaces believed that there were problems with the cost or flexibility of training. When given the opportunity to nominate more specific concerns with

training, respondents most commonly complained about the inadequacy of government funding and cutbacks in public expenditure on training (ESC 1999, pp.106–108).

The ESC has also collected some data on employee attitudes to training in the Hunter. In the main, this data indicates a high level of satisfaction with the training that is received but a strong desire for more training. Most Hunter employees receive some training, although this varies considerably with occupational level. Labourers and related workers are by far the most likely category of employees to have never attended training (55% of those employees). Nevertheless, over 20 per cent of trade and related workers reported never having attended training. An overwhelming majority of employees (79%) felt that more training or education would help them do a better job, although this level of enthusiasm was a little less pronounced for manufacturing employees than others.

The metals and engineering training market in the Hunter: Case study

The metals and engineering sector in the Hunter is confronting massive challenges associated with the globalisation of markets and the intensification of competition exacerbated by the effects of government policies of trade liberalisation and tariff reduction that have lead to the greater exposure of Australian manufacturing more generally. The Hunter has been undergoing an industrial transformation that has seen growth shift away from the traditional heartland of basic metals processing, mining and heavy manufacturing to services.

In the traditional areas of strength in the Hunter, exposure to globalisation is not especially new. Given the combination of a strong tradition in metals and engineering, a profound understanding of the imperatives of global challenges and the recognition amongst employers, unions and (increasingly) the vocational education and training (VET) sector of the importance of innovation and skills development, the Hunter has made significant progress in adapting to and shaping the new environment.

The emerging training market in the Hunter needs to be understood in this context. There is a strong willingness amongst those employers strongly exposed to global conditions to embrace a major and ongoing commitment to training. TAFE and other training providers have also recognised the need to deliver flexible and responsive training. Both employers and providers are under extreme financial and resource pressures, but both sectors increasingly recognise the need to focus on skills development. Under these conditions, the imposition of a training market framework appears to be spectacularly inappropriate. For those employers we consulted, increasing marketisation of training was not seen as the answer to any of the pressing problems confronting them. Naturally, if greater competition between providers was going to result in lower cost, more relevant training than this was going to be welcomed. However, the important innovations occurring in the Hunter are not the result of some simplistic 'training market'. On the contrary, many of the most promising innovations centre on co-operative, or at least co-ordinated, networks that enable employers to share training risks and costs and facilitate the matching of training needs with training provision.

Interviews and less structured discussions were held with several people representing two training providers and with a number of owners, human resource managers, training managers and officers and some of their trainees and apprentices drawn from eight firms across the Hunter.

Issues for training providers

TAFE seen to be increasingly responsive to industry

As might be expected, TAFE continues to play a dominant role in the provision of off-the-job training in metals and engineering in the Hunter region. Despite the existence of New South Wales Department of Employment and Training statistics that show a massive increase in approvals of metals and engineering apprenticeships in the period 1995–1998, TAFE informants claimed that there had been a steady decrease in the number of apprentices in the region over the same period. The recognition of declining TAFE numbers in metals and engineering had inspired TAFE to work more closely with employers, employer networks and

associations, and group training companies (GTCs) in the region to provide a variety of alternatives to the traditional training model, including the design and development of intensive block training to enable accelerated completions of apprenticeships.

> *I think it was a case that TAFE simply saw the writing was on the wall.*
>
> (co-operative GTC)

TAFE initiatives to develop closer relations with employers and GTCs, while clearly enjoying the support of senior TAFE administrators, appeared to depend on the enthusiasm and commitment of particular individuals.

> *It all depends on who you know in TAFE. If there is someone enthusiastic at one of the colleges then they might be prepared to work up a special proposal or course.*
>
> (human resource manager of large workplace)

Group training companies

Some of the most dynamic and innovative initiatives in training in the Hunter are being driven by the relatively small number of GTCs in the region. While each has different approaches, emphases and strengths, they collectively constitute a critical training resource in the Hunter and underline the importance of government continuing to provide strong active support for this kind of structure.

Group training company A is a very large, well-established company that has a number of divisions and affiliates across the State and a strong focus in the Hunter region. It is involved in the co-ordination and training of apprentices (approximately three-quarters of all undergoing training), trainees (less than ten per cent) and in-school trainees (the remaining ten per cent). In addition to acting as a GTC in the Hunter, the company also operates a training centre and a skills centre in the region. The company undertakes training and indentures apprentices and trainees across a broad range of vocations, although metals and engineering accounts for approximately one-third of all apprentices and trainees.

A highly successful group training company

The company's relative success is attributable to a number of factors including:

- the pursuit of a very proactive approach to employers in the region. For example, when the company hears of new projects that may offer the potential for involved companies to take on apprentices, it lobbies project managers or site managers to see if a certain number of apprentice positions can be written into contracts
- an extensive commitment of field staff who liaise with employers and potential employers; maintain an overview surveillance of the labour market; and maintain close relations with both apprentices and trainees on the one hand, and employers on the other. Field officers spend three or four days a week in the field and meet with all apprentices and trainees at least once every six weeks
- the cultivation of a strong image within the region and its communities. The company and its apprentices and trainees are highly visible within local communities and maintains links with schools, interviewing and talking with students and promoting VET

> *It's very important in this business that you keep everyone informed about what you're doing and why you're doing it ... Our success is built on high visibility in the community, being able to deliver the goods, and being able to offer our employers and the apprentices and trainees strong follow-up.* (a manager from group training company A)

In its capacity as a registered training organisation (RTO), the company has taken over responsibility for training for various mining companies and pre-vocational training for a number of metals and engineering firms. Despite the company's role in training provision, their efforts tend to be co-ordinated with TAFE rather than to be strictly in competition with it. Thus, the company signed a memorandum of understanding with TAFE in the Hunter as well as in a number of other regions. In one of those regions, the resulting scheme has seen Year 11 and 12 school students undertaking metals traineeships with TAFE instruction and industry placement organised by the company. This model, relying on *group training company A* links to organise work experience, goes some way to overcoming one of the most commonly stated criticisms of school-based traineeships in metals and engineering—that they lack a real workplace dimension. It also provides an accelerated pathway into an apprenticeship and trainee exposure to particular employers.

Use of co-operative network to establish group training

Group training company B is a small to medium-sized GTC that specialises in facilitating and co-ordinating a genuine group training scheme for approximately a dozen metals and engineering firms in the region. This company has grown out of a very successful co-operative of small and medium-sized engineering firms from the region. The original co-operative was formed as a means for these SMEs to overcome some of the disadvantages of size, share information concerning emerging opportunities and share the costs associated with promotion and information gathering and dissemination.

The firms also confronted considerable problems with training. Many of the firms are involved in niche market production or service provision, and several have successful track records in competing internationally for relatively high technology work that requires a concentration of specialist high skill trades qualifications. The firms confronted certain specialist skill shortages but individually did not have the resources to employ a specialist-training officer or to develop specialist-training courses. The experience of the members of the co-operative was that TAFE courses needed to be more focussed and that private RTOs were inadequate or too expensive.

> *As a group of fairly small companies they realised that the number of apprentices in the system was drying up, they couldn't get the sort of people they wanted for a variety of reasons, they weren't happy with the training providers that were out there and they were really put off by the nightmare of administration when it comes to the paperwork side of apprentices.* (co-operative GTC)

Group training company B employed a training manager and set about negotiating with TAFE a training structure and course content that would appeal to a number of the co-operative's members. The key components of the training structure include:

- a specially designed 12-week block introductory training course provided by TAFE and designed in conjunction with the GTC
- accelerated completion of the TAFE course
- rotation of apprentices around the different firms of the co-operative in order to give them a breadth of experience

Advantages of the co-operative GTC structure

This particular GTC structure appears to offer firms some particular advantages. The firms involved are joint owners of the GTC and are effectively sharing the burden of employing their own training manager who is able to take responsibility for the entire administration of the scheme. The training manager organises all the paperwork associated with the apprentice registration process, liaises between the parent firms, apprentices and trainees and TAFE and ensures that individual apprentices and trainees remain 'on track'. The training manager, being employed in effect by the parent firms, is committed to ensuring that a strong workplace focus exists in as much of the training content as possible. In particular, he is able to take responsibility for the development, with TAFE, of workplace-specific content and workplace-based assessment facilitating effective and reliable assessment procedures that are likely to enjoy the confidence of the parent firms and TAFE.

> *What's effectively happened here is that each of the employers feel like they have a stake in the process ... each firm owns (part of) their own training manager now.*
> (co-operative GTC Manager)

For its part, the co-operative appears to see the GTC as a success. According to the co-operative's management, the GTC has encouraged a more positive relationship with TAFE, demonstrated that small and medium-sized enterprises *can* still get the training they need if they are prepared to co-operate on a regional and industry basis and shown the advantages of having a dedicated training manager that is (indirectly) accountable to the firms that formed the GTC.

Issues for training users

Employers interviewed in the Hunter all tended to concede the importance of maintaining a strong commitment to training to ensure the continuity of skills development in the region. Skills shortages, especially in some of the skilled trades (such as boilermaking) and, more prominently, in specialist skill areas (such as hydraulic maintenance or specialist machining), were a problem for some employers from time to time but were not often seen as a major problem that threatened current productive capacity. Most employers conceded, however, that given the current trends of falling metals and engineering apprentice numbers across the region, skill shortages might well be a major problem in the medium term future. Despite a ready recognition of the importance of skills development and a strong training culture to the future of the industry in the Hunter, employers were unanimous in their observation that their capacity to train was limited by an uncertain business future.

Competitive pressures and effects on training

The very strong message from Hunter employers was that the product or service market environment of their industry and the uncertainty of future developments in the markets in which they competed were the biggest disincentives to a greater investment in training. Hunter employers were united in expressing a lack of certainty in the long term viability of metals manufacturing and engineering.

The second most commonly mentioned disincentive appeared to be the simple economic pressures associated with an increasingly competitive environment while simultaneously accepting that skills development was one of the keys to future competitiveness. Generally, neither employers nor employees in the Hunter saw contemporary developments in the training agenda—user choice, CBT and assessment, the new training package—as a major issue.

> *I'd love to be able to take on more apprentices, training is critical to the future of our industry. But the big issue is the bottom line and who knows if we'll still be here in 12 months time.*
> (small hi-tech equipment workplace)

Changing structure of apprentice intakes

Employers and employees alike referred to the gradual withdrawal of most large employers from their traditionally strong commitment to the training of relatively large numbers of apprentices. A number of interviewees predicted that this was likely to feed into a future shortage of quality tradespeople in the Hunter in the medium term.

Small and medium enterprises and training

Some of the most positive and dynamic approaches to training were found amongst the growing ranks of small and medium-sized firms that had pursued specialist niche markets. One of these firms was competing very successfully in a global market supplying major international clients spread across the world, while another had broken into a specialist local engineering maintenance market. Both were members of the co-operatively owned GTC discussed above.

A very successful exporting manufacturer

Small equipment manufacturer's core business involved the manufacture of specialist hi-tech equipment that had gradually been extended into providing life-long support and maintenance of the equipment. This SME employs a range of tradesmen—sheet metal fabricators, boilermakers, welders, technicians and, typically, three or four apprentices. The company had little trouble in attracting quality staff, and employees tended to see the company as a successful and innovative organisation. The management was critical of the quality and relevance of training traditionally offered by TAFE and had previously used WorkCover to provide curriculum and assessment as the cornerstone of its in-house training for some of its tradesmen.

The firm was an enthusiastic supporter of the GTC. They relied on it to co-ordinate all their apprenticeship training and now expressed satisfaction with the training provided by TAFE. Owing to the prominent role of the GTC's training manager, information on apprenticeship progress was regular, checks on skills progress were now conducted on a weekly basis and there was a high degree of confidence that training was workplace relevant.

The company had previously experimented with the use of labour hire firms but had found them to be too expensive. A degree of flexibility was achieved through a combination of outsourcing some non-core, but regularly needed, functions and the use of one or two casuals from time to time.

Medium maintenance service provides specialist maintenance and support services to the mining and associated industries in the Hunter. The company employs a large number of machinists and specialist fitters as well as some boilermakers and welders. Given the

unpredictable nature of the maintenance work and the need for a variety of skills on a variety of jobs, tradesmen were expected to be able to develop at least rudimentary skills outside their qualified trade area. The company employed a moderate number of apprentices and trainees accounting for approximately ten per cent of all staff.

Company management was critical of training packages that were too 'modularised' or compartmentalised. According to management, apprentices needed significant periods of time actively practicing and working on a particular skill before they could possibly be regarded as 'competent'. The appeal of the co-operative's GTC was that it was able to provide apprentices with exposure to different skills and machinery in different real-world workplace settings over significant periods of time.

While the *co-operative GTC* was seen as a solution to the company's own training needs, the management lamented the failure of many other employers to invest in training. The training market on its own was not seen to be a constructive response to the shortfall of training currently being experienced across the industry in the region. While conceding that the old Training Guarantee Levy had been far too open to abuse, the company argued that employers should be compelled to commit a certain amount to training or be prepared to be compulsorily levied specifically for the costs of training.

> *You either make them provide a certain amount of training, or a certain number of apprentices and if they don't want to, well, fair enough they have to pay up and pay for the training that is provided.* (medium maintenance service manager)

Company management expressed the view that TAFE and the VET sector more generally could only be as good as the quality of industry advice provided to it. In their view the *co-operative GTC* model was so successful because it harnessed the views of a feasible number of employers and enabled those industry needs to be acted on by a dedicated training manager who could then negotiate course content and structures with TAFE and parent firm workplaces. Currently existing mechanisms for the expression and communication of industry views—such as the Industry Training advisory bodies (ITAB's) model—were seen to be too far removed from regional and industry views to work effectively.

> *They're nice enough people and everything but they're just too far away from industry to really k.. w what's going on. What you need to do is get a group of successful businessmen, people who've been successful in this industry and who have a passion for training and get them to run it.* (medium maintenance service manager)

Larger enterprises and training

Large steel processor and manufacturer is a large, very well established steel processor and manufacturer of a range of final products. While the majority of shop floor employees are labourers and process workers, the company also employs fitters and machinists, electricians, plumbers, bricklayers and a handful of boilermakers. At the time of interview, the company employed approximately 20 apprentices, down from the maximum, in recent times, of around 50.

The company has gone through a number of takeovers and restructures over the past ten years. Recent takeover activity and the uncertainties concerning the plant's short to medium term future have placed recruitment in a holding pattern. The recent downturn in the number of apprentices was attributed to a lower turnover in trade-qualified employees, combined with the atmosphere of uncertainty. The firm had experienced difficulties in finding machinists and had been forced to pay a premium in order to attract quality applicants in that trade area.

The company routinely uses labour hire firms for recruitment. When a trade vacancy arises, the company typically approaches a labour hire firm and asks them to provide a shortlist from their books. The successful recruit is then employed through the labour hire firm for a three-month probationary period, then hired permanently if satisfactory.

The company has achieved significant reforms to work practices over the past ten years, specifically in two ways—the introduction of 12-hour shifts for many of its labourers and the removal of demarcations allowing process workers to perform a broader range of tasks. This multi-skilling of process workers appeared to directly affect the company's demand for certain tradespeople such as boilermakers. The company had also moved to outsource most maintenance work. The multi-skilling of process workers and consequential improvements to production efficiencies was achieved in the context of a major increase in capital expenditure on new technology, plant and equipment over the past decade. However, new capital investment had completely dried up in the past few years as the last two owners attempted to cut expenditure.

Workplace change had also been achieved in co-operation with the three unions that maintain coverage of the plant. The company had always insisted on sustaining strong relations with union officials. The plant had a history of industrial disruption; previously up to seven per cent of production time was lost through stoppages. Management attributed union co-operation in the introduction of workplace changes to two factors—the involvement of unions in the negotiation of the changes through joint consultative committees, and the introduction of a no-retrenchment policy in exchange for greater mobility of workers between shopfloor tasks and between trade and non-trade work.

Large steel processor and manufacturer had traditionally been a strong training workplace. Apprentices would typically spend the first six months training full-time in a training skills centre operated by a GTC. Then apprentices followed a traditional apprenticeship path; that is, attending TAFE one day per week and undertaking on-the-job training that had increasingly become less structured. The company had periodically considered using private-training providers but had always rejected them because of higher costs and their inability to provide much of the specialist training required.

CBT and the training package

The introduction of CBT had made relatively little difference to shopfloor operations or training in the company. A number of workers were initially re-classified as a result of the introduction of the new classification structure, but in reality the training agenda had had little further impact. Management expressed the common view that the new training agenda had succeeded in making the administration of apprentices more complex and bureaucratic. CBT looked more attractive in theory, owing to the possibility of developing more flexible pathways; however, it also allowed more apprentices to 'fall through the cracks in the system'.

> *What we have here is still pretty much the buddy system, a traditional apprenticeship system. Competencies are good in theory and can be good in practice but that's not the big issue. The big question is what is going to happen with this business in the short to medium term. That's what will determine the quality or extent of our training ... Ultimately they come down to political questions about what sort of game we want to be in ... I mean, Australia. Do we really want to be in manufacturing at all?*
>
> (human resource manager, large steel processor and manufacturer)

The company did not feel it could ever be in a position to undertake the level of workplace testing and assessment required under the new training package. They simply did not have the resources to introduce a genuine system of workplace-based training and assessment. Nevertheless the company had been able to improve the workplace relevance of much of its training by developing improved relations with what was generally seen to be a more responsive TAFE. TAFE teachers would often contact the company and ask to conduct training sessions on some of the firm's equipment, and the company would generally agree.

Concerns over apprentice quality

Company management was critical of the standard of many new apprentices. In recent years, they had experienced a dramatic increase in the number of apprentices who were

unacceptable and who failed to complete their apprenticeships. Management felt that there was a major problem in the articulation between school and entry level training. The industry, and what the various trades involved, was poorly understood by school leavers and society more generally. Turning around the image of metal trades and developing ways of attracting quality school leavers to trade apprenticeships was seen as an urgent problem.

Declining training in a declining firm

Large specialist manufacturer is a large, long-established heavy engineering works that moved out of general engineering 15 years ago to concentrate on the manufacture of a specific line of equipment. At time of interview, the workplace was well advanced in a program of mass retrenchment which will see the employer shrink to little more than five per cent of its size some ten years ago. In very recent times, the company, which historically had operated exclusively in the Australian market, had turned its attention to pursuing overseas contracts with some success. The size of those contracts at the present time was, however, unlikely to lessen the need for the anticipated retrenchments. The firm continues to employ a large number of tradesmen in metal fabrication, fitting, machining and boilermaking and some in electrical trades, vehicle building and spray painting. The company had traditionally been a very important employer of apprentices; the classic example of the large, diverse metals and engineering employer that trained hundreds of apprentices and engineering cadets providing a steady supply of skilled tradespeople for the entire region and beyond.

Now the apprentice intake has completely collapsed. The workplace-training centre lies idle because there are now too few apprentices to make its operation viable. The firm is now desperately attempting to transfer its remaining apprentices and cadets to other workplaces and GTCs in the region. The very survival of this workplace appears to be dependent on its success in cultivating overseas markets over the medium term. The dramatic effects of the potential loss of a company in the region with such a strong training culture are difficult to overestimate.

The company has typically employed an entirely full-time permanent workforce. Flexibility and recruitment has generally been achieved through the use of labour hire firms and a labour co-operative. During peaks, for example, fitters were engaged on an hourly rate through a labour hire firm. The site has always been very highly unionised. More difficult economic conditions in the sector since the early 1990s had undoubtedly contributed to 'less disruptive' union behaviour.

The scale of introducing CBT and assessment

The company had been an enthusiastic supporter of the introduction of competency-based classifications, training and assessment since 1989. Personnel had structured the entire introduction of a competency-based system as a five-step process. On its own estimation, the company had completed just two of those steps in ten years. 'If nothing else, CBT has created a job for someone to do' (Human Resource Manager, Large Specialist Manufacturer). At the present juncture, with retrenchments the order of the day, there was no one available to do that job. As a result, the training reform agenda has stalled, and thus the company had continued to rely on the old curriculum-based system. The task of mapping competency standards onto existing jobs was still far from complete, and it was estimated that it would be a full-time job for a six-to-twelve-month period.

As a company with a strong training culture, it is unsurprising that it reported relatively good relations with the local TAFE. However, there were some problems: in the opinion of management, TAFE assessments of apprentice competence were no longer adequate; most TAFE teachers would benefit from greater exposure to workplace technologies and current practices. Whether under the old system or the new training package there remained workplace specific needs that were not covered by the current range of modules. The company had always undertaken a fair amount of workplace-based training to cover those

gaps and had periodically purchased and customised modules from TAFE or other RTOs. The company also actively encouraged training through a further education assistance policy which provided up to four hours per week paid to undertake an approved course of training. Fourth-year apprentices, for example, were routinely encouraged to undertake post-trade studies.

Evidently this workplace was one of a minority in the Hunter that, if it were able to continue operations, would be able to undertake the degree of workplace-based training and assessment envisaged by the new training package. The company had engaged consultants to develop workplace-based assessment tasks for many of the key trade competency standards. Its capacity to follow through on training reform was now compromised by the collapse in work. For example, the workplace had lost its training officer position, and prospects of further training reform were bleak.

Adaptation of CBT to suit the workplace

Medium to large engineering works is a medium-to-large-sized heavy engineering works involved in the design and manufacture of a range of finished products and components supplemented by general engineering. The company had also experienced recent changes in ownership; however, unlike some of the other large Hunter firms, this had not apparently affected its traditional autonomy in determining its fundamental strategy. That strategy was based on diversification within metals engineering. Management noted that competition had increased quite dramatically over the past five years and that cost pressures had adversely affected capital expenditure. Competition was now more likely to come from an increasing number of SMEs rather than from the traditional big players.

Half the company's trades employees are boilermakers, with the remainder spread amongst fitters, machinists and electricians. The company was a relatively large employer of apprentices and prided itself on sustaining a strong training culture. The ratio of apprentices to tradespeople is presently slightly greater than 1:3. As with *large steel processor and manufacturer* the workplace had achieved significant work organisation reforms over the past decade in conjunction with the two unions that between them organised all workers on site. Again this involved the extensive use of joint consultative committees (JCCs), the removal of demarcations, and the expansion of the responsibilities of both labourers and trades workers.

The workplace demonstrates that competency-based standards can be successfully introduced in a workplace provided there is strong management support over the long term, union involvement, and, perhaps most importantly, a preparedness to adapt the competency-based system to the particular needs of the workplace. For example, management at the workplace took the view that the collapse of the previously existing 314 classifications into the new 16 levels was inappropriate and, instead, developed a series of levels with the new C levels. In conjunction with the JCC, the firm developed job models for each of the base trades, then similar models for higher levels. The models were then discussed and refined with individual employees. Skills audits for each position were then undertaken and competency standards matched against each position. The competency profile for each worker was then discussed with the worker and a union delegate, and, in the case of dispute, a competency test was then offered to the employee. When competency profiles were finalised, each employee signed off on the audit and the skills were entered into a database that is now updated as workers achieve new competencies. The full implementation took approximately three years.

> *It's important to involve each and every worker in the process of establishing competencies and undertaking skills audits. We didn't have any problems. If there was a disagreement then this was always worked out in a meeting with the worker and a union delegate.*
>
> (training manager, medium to large engineering works)

Management argued that there were significant advantages in establishing a properly implemented, tailored system of competency standards: it enabled Recognition of Prior Learning (RPL) which built employee trust and provided an incentive to accept workplace change; it allowed greater uniformity in payment for skills; it allowed greater portability of

skills; and it provided employees with a clearer picture of training imperatives and opportunities. Management regarded the skills database as the greatest single resource to come out of the entire process.

Training culture

The workplace has very well established internal progression pathways. Everyone in the production and planning department, for example, has come from the shopfloor. Management did not see great advantages in the new training package. The possibility of accelerated completion of apprenticeships was regarded with scepticism. The vast majority of apprentices required the full four years as much for personal reasons as to gain the shopfloor experience that could only be gained over time.

The workplace had never experienced any difficulties in attracting large fields for advertised apprenticeships, although management again expressed concerns over apprentice quality. Management agreed that trade careers were not well understood in the community. As a result, the company had developed closer links with schools as well as with the TAFE colleges in the district. School students were offered short periods of work experience on site so that at least they would have some first-hand understanding of the nature of the work and the environment. In a program organised with the local branch of the Department of Education and Training, the workplace had taken in a schoolteacher for a four-week sabbatical in an attempt to increase his appreciation of the trade opportunities that existed. In an oft-repeated observation, management believed that this sort of program could increase the possibility of school careers guidance officers suggesting a trades career in metals and engineering to students.

Company management was also keen to further develop their relations with the local TAFE colleges. While their impression was that TAFE teachers were similarly enthusiastic and recognised the need to have close relations with local industry, it was apparent that the time and resource pressures on TAFE teachers were considerable. Management suggested that a more formalised system of TAFE fieldwork or industry liaison officers would be valuable. TAFE equipment and its overall training standard were rated quite highly, although recent changes to TAFE's methods of assessing apprentices and trainees as either 'competent' or 'not competent' were criticised.

Despite a strong tradition of training and a demonstrated willingness to make the training agenda reforms work for them, *medium to large engineering works'* management expressed concerns over the implementation of the new training package. In particular, they felt that the new emphasis on workplace-based assessment, while good in theory, would possibly place unacceptable burdens on the business. It is notable that this sober assessment comes from an employer that has traditionally been prepared to expend significant resources on training and workplace-training reform.

Work organisation restructuring in large plants

Large steel product plant is a large producer of construction materials. Over the past few years, their operations have been dominated by a rationalisation and restructuring program that has seen a moderate reduction in the workforce. Productivity improvements have been achieved through work organisation changes based on teamworking and the multi-skilling of production and trades workers alike. Fitters, machinists and boilermakers account for about a quarter of the workforce, and the remainder of the shopfloor are employed as process workers. The workplace currently employs about five per cent of its total workforce on apprenticeships and utilises a GTC for pre-apprenticeship training.

For some years, training of the workforce has been directed toward the goal of implementing these workplace changes and 'changing the culture of the place'. Management used some of the opportunities provided by the training agenda reforms to assist in the introduction of workplace changes more generally. Evidently the workplace's primary focus has been on

training for teamwork; nevertheless, it has made some progress with the introduction of competency standards having developed workplace-based training modules for approximately 20 competency standards in the areas of greatest need. Theory is taught by TAFE, and one of 20 accredited workplace trainers then conducts the on-the-job component and assesses against the competency standard. Management acknowledged that the development of workplace competencies for the workforce has been relatively expensive and time-consuming but that it has succeeded in making training more workplace relevant.

While the workplace appears ideally suited to the use of the Engineering Production Certificate for its large number of process workers, management expressed little enthusiasm for its introduction. This may be related to management's satisfaction that, in the current labour market, it can now attract trades-qualified applicants for its process work positions.

Large processing plant also employs predominantly process workers in its large workplace. As part of a far-reaching rationalisation program, the workplace has reduced the number of tradespeople employed through the implementation of two strategies: process workers have been increasingly required to perform routine tasks previously only performed by trade-qualified workers; and outstanding functions requiring trade skills have been outsourced. The ambition of management is to continue to gradually reduce the number of tradespeople employed. As a consequence, the number of apprentices employed has been significantly reduced.

This is not to say that, in recent years, *large processing plant* has not devoted considerable resources to training. The focus of its training has been on the development of new processing and production skills amongst its process workers. They are now required to be responsible for a broader range of tasks, including those that previously were regarded as being trade, supervisory or maintenance functions. All the training of process workers in adapting to the new work organisation structure has been conducted in-house utilising training modules developed specifically for the site. Management regarded the training reform agenda and the new training package as largely irrelevant to their operations, although they felt that the new training regime was organised according to competency-based principles.

Intermediaries

There are few institutions that could be said to 'mediate' the metals and engineering industry training market in the Hunter beyond the GTCs (two of which were discussed above), the unions and the industry employers' associations.

There is only one New Apprenticeships Centre (NAC) that operates in the Hunter. The centre appears to have a relatively low profile and is not apparently geared to the provision of any specialist advice with respect to training opportunities in metals and engineering. This is entirely understandable given that this NAC is the only one for the entire region and thus is responsible for providing assistance relating to training in every field. The centre was not mentioned by any of the interviewees or key informants in the Hunter. When employers were asked to evaluate the NAC, they all responded that they had no direct knowledge of its operations.

Union informants expressed the view that there was an increasing failure of employers in the region to provide adequate training, especially through apprentices. Much of the problem was that some of the biggest and best employers in the region had either closed down or rationalised and that many other 'good employers' were facing uncertain futures. It was also noted that, despite the possibilities that existed under the CBT system and the new packaging arrangements for formalised training and recognition of qualifications for production and process workers, very little progress had been made with the Engineering Production Certificate.

The employer association representatives agreed that there probably was evidence of apprenticeship decline in the Hunter. It was emphasised that the future of innovative

manufacturing and engineering would increasingly require the development of design skills as well as process skills. Successful, innovative, export-oriented firms would increasingly have a core of multi-skilled, highly skilled workers who would have extensive training needs and a periphery of less-skilled workers. The association representative also expressed the view that the best responses to training problems in the region involved industry networks co-operating, and then seeking the support of government and other regional institutions for those initiatives. The view was expressed that CBT and assessment reforms had tended to fail in most workplaces simply because most employers did not understand what the reforms meant, and because the new training packages were too complex.

Key findings

- The training decisions of employers in the Hunter have not been fundamentally shaped or influenced by recent policy reforms, the introduction of CBT or assessment or the emergence of an industry training market.
- Training decisions, especially decisions to take on apprentices, are fundamentally influenced by employers' assessments of their medium and long term prospects. Globalisation and its associated effects on the intensity of competition, cost pressures, and business insecurity have adversely affected employers' willingness to invest in training, especially apprenticeships.
- A number of other industry trends, often consequential to the intensified competition associated with globalisation, are militating against adequate training: outsourcing and the use of labour hire; downsizing; cost-cutting; an emphasis on more workplace-specific in-house training; the expansion of skills and tasks demanded of process or production workers at the expense of more highly trained trades-level workers.
- Employers in the Hunter also mention a range of other factors that impact on apprenticeship and other training decisions, including:
  - the relevance of training to their workplace operations
  - the costs associated with training
  - the administrative burden associated with apprenticeships and traineeships
- Some of the most prominent success stories in the Hunter have involved groups of workplaces coming together to form a GTC of their own or using an existing GTC. These models appear to assist workplaces to better communicate with training providers and to more easily share the costs and burdens of training.
- Generally, there is not a strong or widespread awareness amongst employers of the details of the training reform agenda, of the many advantages associated with CBT and assessment, or the flexibility of the new packaging arrangements. Where progress has been made with competency-based reforms, this has involved a major, long term commitment of the workplace to pursue change.
- Communication between training providers and employers and the co-ordination of employer training demand and training supply is not very strong.
- TAFE training is seen to be relevant, and TAFE is seen to be increasingly responsive to differing industry needs. Private providers have not made a notable impact in the provision of metals and engineering training in the Hunter.

The labour market in South-West Sydney

The South-West Sydney area includes areas bounded by the Bankstown, Liverpool, Fairfield and Inner-West Department of Employment, Education and Training regions. The following statistical profile draws from two sources: the Office of Labour Market Adjustment (OLMA) Regional Labour Market Assessment, conducted for South-West Sydney in 1994; and the Growing Regional Opportunities for Work (GROW) Council work profiles for South-West Sydney, released in 1997.

The data for South-West Sydney show that there are two distinctive features of this labour market. First, the area has a lower proportion of tertiary-qualified people than other areas of the State and Australia. This could change in the future as there is a relatively higher proportion of teenagers at school. This finding is also reflected in the occupational mix of the region. It has proportionately less professional and para-professional workers and a higher proportion of trades and labouring occupations than New South Wales and Australia generally.

Educational profile

Across the South-West Sydney region, the level of educational attainment is generally slightly lower than it is for New South Wales and Australia. For example, the proportion of persons with a degree or higher is 6.4 per cent compared to 8.3 per cent for New South Wales and 8.3 per cent for Australia (OLMA 1994, pp.16–18).

Youth attendance in education is an indication of the future skills pool in a labour market. In South-West Sydney there was a slightly higher proportion of teenagers at school than for the State or national averages (51%, 49.5% and 49% respectively). This higher than average result can be attributed to Liverpool where teenage participation in education is 56 per cent (OLMA 1994, pp.16–18).

Unemployment

The unemployment rate for South-Western Sydney for the June quarter 1993 was 13.0 per cent, which was slightly above both the State and national rates in the period (10.6% and 10.8% respectively).

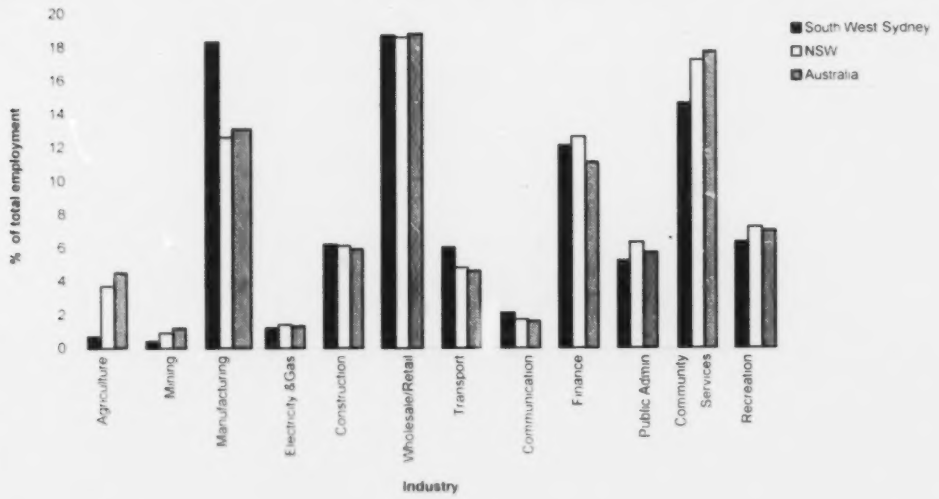
In the South-West Sydney region the main reason for unemployment was as a result of job loss (39.3%), followed by first job (33.2%). The least common reason for unemployment was as a result of being stood down (1.4%).

Of those who had been retrenched the highest proportion (39.5%) had previously been employed in a manufacturing industry and a significant proportion of all those retrenched were employed as labourers (40.8%) (OLMA 1994, pp.21–27).

Workforce characteristics

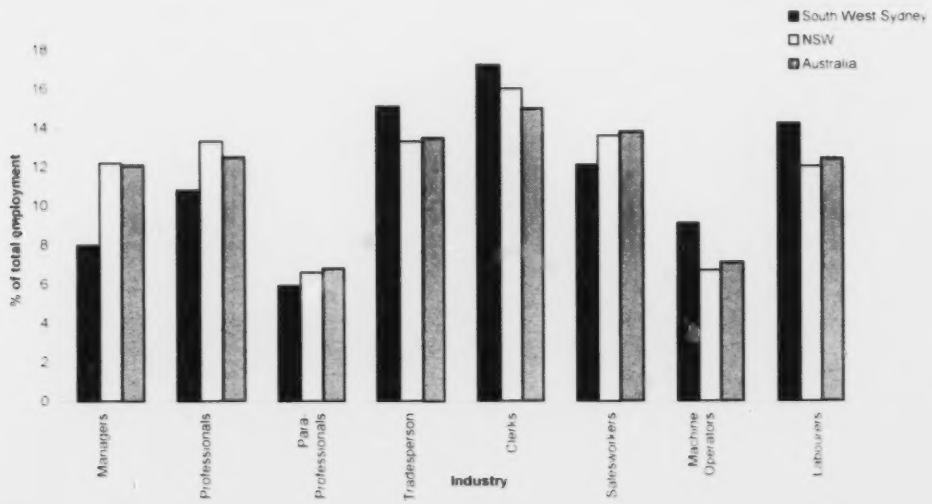
The main industry in the South-West Sydney area is the wholesale and retail trade industry, which employed 18.7 per cent of all workers. This is closely followed by the manufacturing industry, which accounted for 18.3 per cent of employment in the area. Other significant employers were the community services (14.6%) and finance (12.1%) industries (see figure 3).

Figure 3: Employment by industry (percentage share of total employment)



Source: OLMA (1994), p.28

Figure 4: Employment by occupation (percentage share of total employment)



Source: OLMA (1994), p.29

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The occupational profile of South-Western Sydney shows that there are fewer managers, professionals and para-professionals in the region than the average for both New South Wales and Australia.

The region, however, has a higher proportion of non-professional workers than the average for other areas in New South Wales and Australia (see figure 4).

Future employment growth

In 1996–97, the GROW Employment Council surveyed more than 10 000 employers in South-West Sydney, covering 57 industry groups and 440 occupations. The geographical scope of the survey included Liverpool, Canterbury-Bankstown, Campbelltown and Fairfield.

GROW's research predicted that strong job growth will not occur in small firms (with the exception of accommodation). Employment growth is most likely to occur in medium to large firms in the following industries:

- wood and wood products and furniture manufacturing
- equipment manufacturing
- electrical and electronic equipment manufacturing
- motor vehicle and parts dealing
- supermarket and grocery stores
- bread, cakes, take away food and specialty retailing
- department stores
- clubs, pubs, taverns and bars
- cafes and restaurants
- hospitals
- accommodation
- sheet metal, metal finishing and fabricated metal product manufacturing
- electrical, electronic and professional equipment wholesaling
- metal and mineral wholesaling

GROW also identified a number of occupations where job opportunities are likely to increase:

- checkout operators
- sales assistants (food and drink products)
- metal tradespeople
- engineering production workers
- product assemblers
- wood and wood products factory hands
- cabinet makers
- kitchen hands, fast food cooks & sandwich hands
- sales assistants (other personal and household goods)
- sales representatives (motor vehicle parts and accessories)
- bar attendants
- waiters
- security officers

Areas of skills shortage

The GROW report categorised occupational opportunities into four main types. These categories are useful for the identification of potential skill shortages:

- Occupations with high vacancy levels and low recruitment difficulty (more than 250 vacancies a year)—sales assistants, storeperson, heavy-truck driver, engineering production worker, checkout operator, kitchenhand, commercial cleaner, accounting clerk, sales assistant (fabrics, clothing & footwear), delivery driver or courier.
- Occupations with high vacancy levels and limited recruitment difficulty (more than 100 vacancies per year)—sales representative (personal and household goods), carpenter, sales representative (industrial products), shop manager, security officer, sales representative (motor vehicle parts), wood and wood products factory hand, sales and marketing manager, general mechanical services plumber, general electrician.
- Occupations with high vacancy levels and high recruitment difficulty (more than 100 vacancies per year)—motor mechanic, metal fabricator, concreter, fitter, panel beater, cabinet maker.
- Occupations with low vacancies and high recruitment difficulty (fewer than 100 vacancies a year)—toolmaker, sheet-metal worker first class, furniture removalist, vehicle painter, metal machinist first class, welder first class, general mechanical engineering tradesperson, electrical engineering associate professional, mechanical engineering associate professional.

The survey found a strong preference among employers for workers with previous industry experience. There were few skill shortages in non-trade positions, so the labour market tends to be highly competitive for these types of occupations.

The GROW report highlights five key issues with regard to the South-West Sydney labour market and potential areas of skill shortage:

- there is an under-supply of trade skills in many occupations
- employers who are not prepared to recruit people without experience restrict access to positions
- there is a lack of job opportunities for non-trade positions, and these are marked with recruitment difficulty
- unemployed and other disadvantaged groups face multiple barriers to employment, and the labour market is highly segmented
- the local labour market is not generating enough job vacancies to significantly address unemployment

The metals and engineering training market in South-West Sydney: Case study

As noted in volume 2, the metals and engineering sector has experienced some dramatic restructuring over the last decade and a half. This has overshadowed many of the training initiatives which have been introduced in an attempt to improve the industry's competitiveness. In particular, these changes have meant that the 'image' of industry is not good. Employers and training providers alike reported that manufacturing is constantly associated with decline. Equally, the status of a trade education has fallen in the eyes of the community. Trade training in engineering is no longer seen as a prestigious or clever option.

Another factor to keep in mind is that recent reforms have been built on the assumption that participation and consultation with a wide range of parties is needed for success. But this process takes time for both educators and employers. Given the general level of cutbacks in resources for workers and managers alike and increased levels of work intensification, time is a commodity in short supply. Consequently, while the processes advocated for reform have been sound, the reality has often been quite different.

The following material summarises the key findings arising from interviews and less-structured discussions held with training providers and owners, human resource managers and training managers drawn from five firms operating in South-West Sydney. Firms that were recognised as 'leaders' in their field in both commercial and training terms were deliberately selected for study. This was to ascertain how well the training market was operating for firms most likely to need it and draw on the services available from it. If the reforms are not working well in these cases, we can be pretty confident they are having even less impact on the less successful firms in the industry.

Issues for training providers

The training providers' interviews all came from TAFE. Their comments address four key issues.

The changing labour market situation

The training providers argued that the nature of apprenticeship demand is changing. They noted that the traditional model is in decline for a number of reasons:

- jobs are narrowing and very little genuine multi-skilling is underway
- there is a growing preference to apprentice older, more committed workers. Because of concerns over apprentice quality, employers are increasingly reluctant to 'take a chance' with a new recruit. Hence the interest in taking on older workers as apprentices or a third or fourth-year apprentice
- technological change reducing the need for skill
- skill shortfalls are being managed by making do with people with even just the slightest level of skill of the type required. Such people do not subsequently get formally trained

The assumptions underpinning recent training reforms are flawed

The TAFE staff interviewed noted that every one likes the idea of flexibility, input and participation, but these objectives are not easily achieved. For example, too much is expected of TAFE. It is good at providing a sound theoretical and practical grounding in a range of foundation competencies. It is not well set up to anticipate or meet customised requirements for particular workplaces. On the other hand, private providers are not moving to address this problem. If anything, they are exacerbating it. They tend to offer training in the least capital intensive training modules leaving the more expensive training to TAFE. So the market allows the private providers to 'pick the eyes out' of the market. Modular training compounds these problems. Students have increasingly different backgrounds because they are not coming through a predictable pathway. Constantly changing modules are also difficult for trainees who are completing one or two modules at a time. TAFE staff also noted that while the reforms are supposed to be employer driven, it is difficult for employers with relevant workplace experience to provide detailed input into training. Often they may not have the time, knowledge, information or expertise to contribute.

The training reforms are not widely diffused

The TAFE interviewees indicated that CBT and classification restructuring had made little impact in most workplaces. Moreover, where they had had an impact it was often negative. For example, there have been some problems with the new nomenclature. New certificates do not match with employer understandings of jobs. Within a particular qualification, an apprentice or trainee may have done very little or a lot of a particular skill. New titles were reported as being more universal but not particularly informative.

Key aspects of the VET reforms remain unresolved

Issues raised in discussion on this point noted, *inter alia*:

- a major problem with CBT is that while someone may be competent at the time of accreditation, if the skill is not used the competency may be lost as soon as six months later
- mapping existing courses and modules against specific competencies is extremely difficult and time consuming. Hopefully, a new computer package accompanying the training package will assist
- problems with new approaches to assessment were reported as being particularly serious
- the new training package emphasises workplace-based assessment, implying that you cannot really be credentialled until its 'validated' in the workplace. TAFE can teach the theory and the skills, but until students actually get workplace-based experience they will not be accredited. In some cases there may be years between undertaking a course and gaining relevant workplace experience
- how will assessment actually be undertaken in the workplace? For example, will TAFE teachers do it?
- who will pay for such assessment?

Advanced diplomas are not working as planned

At its peak, up to 40 per cent of advanced diploma students had come through a trade apprenticeship. So the decline in the trade area has had a flow through effect in the advanced diploma area. University has been increasingly attracting these students. A major problem in

this area is the fact that in order to do the advanced diploma you need to be working in the area, but many current students are doing an advanced diploma to change career path. According to an estimate of one TAFE focus group, only one in 30 advanced diploma students indicated that they were currently working in the area in which they were being trained.

Issues for training users

Interviews with employers identified the following as important issues relevant to this project.

The key challenges employers face concern globalisation and not training issues

Interviews with employers revealed few strong sentiments about the training system. Most felt it worked quite well for their current purposes. The major issues of concern to them related to the wider economic environment. The *medium-sized toolmaking establishment* reported that the major problem it faced was working in a fragmented industry. Such an industry structure had worked well in the days of high protection but now meant that the Australian toolmaking industry lacked the organisational capacity to succeed in world markets. The owner of this workplace was therefore devoting significant effort to improving co-ordination between toolmakers to help increase the industry's ability to succeed in world markets. A group training scheme was being proposed in this industry-wide development context. For the *manufacturer of light fittings*, the key challenge is cheap imports from countries like China. While Australia has virtually no tariff protection, most Asian countries do. The *manufacturer of aircraft components* noted that severe fluctuations in demand in a situation of global excess capacity were proving the major challenge at the moment. The *manufacturer of specialised pressure vessels* indicated exports had fallen not because of lack of competitiveness but because Asian firms to which product had previously been sent had established their own industries. This firm had met this challenge by establishing licencing arrangements with these new producers, thereby providing an income stream for further research and development. This research in turn provided the basis for developing new processes which could then be subsequently licenced.

Pressure for 'shareholder value' would reduce resources for training and even survival in several of the firms studied

The *medium-sized toolmaking establishment* is a private firm. All profits are ploughed back into the business. The establishment paid for over 7000 hours of training last year and continues to take on apprentices. The owner noted that if the factory were publicly owned, it would not survive long because shareholders would demand dividends, thereby denying the firm resources to grow. A similar observation was noted by the producer of specialised pressure vessels. Both these workplaces are recognised in the metal industry as leaders in their field. These observations raise important questions about the compatibility of shareholder pressures with longer run development of high value-added industries based on engineering skills in contemporary Australia.

Each of the workplaces studied had a diverse range of training arrangements

Much training policy debate is conducted with a stereotypical vision of what training at workplaces looks like. What was interesting about the workplace studies was the diversity of their practices. The *medium-sized toolmaking establishment*, for example, regularly sends a contingent of its more experienced tradesmen overseas to learn new production techniques. On their return, they write up their experiences and conduct formal, on-the-job training sessions with other workers in the factory. The producer of specialised pressure vessels has

for years been developing its own specialised in-house training program in the techniques only it uses. These arrangements are crafted to build on and not substitute for the more generalised training provided, for those involved in the fabrication trades. Finally, the producer of aircraft components has been using competency-based approaches to training its apprentices for years. This involves apprentices having their own log books and their supervisors marking off skills as they are acquired. These arrangements are merely one part of a wider range of training practices that involve the following:

- occasional use of private providers for specialised courses
- training provided by equipment suppliers
- specialised training provided in-house by supervisors and the training department
- quality-related training
- computer-related training

Training was seen as involving more than meeting operational needs

It has become fashionable to regard training an important issue having a bearing primarily on economic development. This aspect of training was recognised by all employers. It was not the only way they considered the issue. Some employers also regarded it as assisting young people make the transition from adolescence to adulthood. Ironically, it was the owner of a specialised labour hire company servicing the metal industry who made this point. He argued that long term relations between an apprentice and a tradesperson were important for a quality training experience. He acknowledged that apprenticeship numbers were falling, and this was due to the increasing economic uncertainty in the industry. Apprenticeships could, however, be made more attractive in the current situation by:

- providing something akin to a pre-apprenticeship during the final years of school
- providing a subsidy at the equivalent level of the dole for the first two years of the apprenticeship
- having the employer meet the full cost of the apprenticeship for the final two years of an indenture

When it comes to training issues, the major problem is higher education, not VET

This issue was noted by two employers—the toolmaker and the fabricator of pressure vessels. They argued that TAFE was quite responsive to suggestions for improvement. Universities, on the other hand, showed little interest in developing properly articulated training arrangements. This often resulted in the interested employee having too much repetitive training when they undertook high level credentials.

Employer reluctance to train arises from two major sources: A commitment to maximise profits in the short term (where shareholders are concerned) and uncertainty about the future

The forces pulling against investment in training are strong. For the manufacturer of specialised pressure vessels, the immediate threat arises from an increase in poor quality imports as Australian standards are relaxed and lower overseas quality standards of production are accepted. This workplace is responding by increasing innovation in its production process and output. This requires both a deepening of the skills base and increasing resources being devoted to researching more productive techniques. Australia has an advantage in that it is recognised as a highly skilled producer in this field in Asia and is therefore respected as an exporter of expertise. But investment needs to be maintained in both R&D and skills development to maintain this position. If investment levels are compromised in the interest of maximising short run returns to shareholders, it will compromise the country's competitive advantage. Moreover, the manager at this workplace argued that skills were an industry resource that needed to be nurtured. If our skill formation system becomes too enterprise specific, the industry will lose its attractiveness to new recruits. Hence to remain attractive to quality labour market entrants, it needs to offer the prospect of transferable skills and a variety of jobs in which they can be used.

One of the most interesting cases studied was the *medium-sized toolmaking establishment*. The manager of this site reported that the biggest problem facing the producers of specialised components for machine tools (i.e. the toolmaking industry) is that it suffered from a tradition of excessive competition. As noted earlier, in the era of import protection, toolmakers engaged in cutthroat competition to win a share of the domestic market. The legacy of this production culture is that it undermines the ability of the industry to co-ordinate capacity to offer serious challenges to toolmaking concerns overseas. This establishment has gone from exporting no output to exporting 50 per cent of turnover in four years. It is now involved in creating partnerships with other toolmakers in Sydney so that, in concert, they can bid for a wider range of overseas jobs than would be possible if they operated alone. The manager is currently trying to broaden this approach to industry development to a larger number of firms to improve the capacity of the industry to win a bigger share of the world toolmaking trade. Prime amongst these is the development of a new Australian Toolmakers Institute to co-ordinate marketing, research and development and product-testing facilities. The formation of a specialised toolmaking group training company also makes up part of this proposal.

Both these cases underline the key finding arising from the interviews with employers—training policy needs to be located in the wider context of strategies for competitive success in the international economy. Such strategies require institutions and arrangements that involve more than placing faith in so-called 'market mechanisms'.

Intermediaries

At least four and as many as six GTCs operate in South-West Sydney. Information about the operation and impact of group training was obtained from employers and TAFE staff interviewed. They noted some of the complexities associated with this approach to employment-based training. For example, some TAFE staff noted that it is often difficult to track where a trainee or apprentice may be working. Ironically, an owner of a labour hire company argued that group training was not the answer to the current crisis in the apprenticeship system. He argued the major disadvantage of group training arrangements

was that apprentices and trainees 'don't have someone standing over them. Kids need to be pushed. Group training may work well in a non-metro setting, but not in an urban setting'.

But these negative comments were only isolated. By and large group training was regarded as providing an important part of the region's training arrangements. Whilst spending a day travelling around with a field officer from a GTC in the region, it became apparent from interviews with group training apprentices and host employers that group schemes performed the following important functions:

- they provide a spur to host employers to follow proper procedures (e.g. workplace assessments)
- they screen poor performers and free employers of the difficult task of screening applicants
- they keep administrative costs down associated with hirer trainees/apprentices to a minimum
- they cover apprentices who are away sick
- they provide support and advice about managing apprentices and training them to both host employers, their supervisors and the apprentices/trainees themselves
- they make hiring an apprentice/trainee easier because the risks of employing a new person are shared with another institution
- they often turn a marginal employment position into a structured training position

In a nut shell, they tighten up and improve the quality of labour supply and they also improve quality of training positions (where they have effective and properly resourced field officers).

Key findings

In metal and engineering the training market is failing to clear. There is excess capacity (in terms of TAFE-teaching capacity), yet there is also, paradoxically, excess supply (in terms of young people seeking apprenticeships) and excess demand (in terms of employers in metal seeking to cover skill shortages). This is not a new problem; however, it appears to be getting worse:

- The problems of co-ordination are quite pronounced in South-West Sydney.
- There is significant doubt about the relevance and impact of the new training packages. In particular the training packages appear to suffer from the problems of:
  - complexity in interpretation and application
  - unreasonable burdens and costs being placed on potential employers of apprentices
  - creating further disincentives for potential apprentices
  - a lack of effective publicity about the new changes amongst providers and, especially, employers
- Training is seen as a cost rather than as an investment. This is part of a general problem in industry. In metals, training has always been disproportionately funded by large employers and subsidised by the State. Globalisation has had a particularly deleterious effect on this traditional model. Outsourcing and associated use of labour hire firms has been a major cause of lower levels of training being undertaken by large firms. Apprenticeships have fallen, especially amongst the large employers who used to take the vast bulk of new apprentices. Smaller employers and the growing labour hire firms, which are the growing part of the industry under globalisation, are demonstrating a great reluctance to maintain adequate levels of training.

- Training issues need to be understood in the context of wider economic pressures. Greater co-ordination is needed at industry level to boost international competitiveness. Improved multi-employer arrangements would also provide a sound basis for improved training arrangements. As matters stand, initiatives associated with industry training markets are at best irrelevant and at worst counterproductive in helping firms meet the challenges of globalisation.

The information technology training market in South-West Sydney: Case study

For the purposes of this case study, the South-West region includes the Australian Bureau of Statistics (ABS) statistical local divisions of Canterbury-Bankstown, Fairfield-Liverpool, Inner-West, and Central-West. Interviews were conducted with training providers (public and private), training users (comprising a cross-section of large and small businesses), and mediating organisations (NACs operating specifically in the South-West area).

The interviews were semi-structured and covered four broad issues:

- the range of IT training available in the area, and whether this is meeting demand
- the perceived impact of globalisation and the effects on training provision and the availability of IT skills
- success stories and failures in the operation of the industry training market
- problems, and the solutions developed by key players to address these problems (including any prototypes/models currently in operation)

Issues for training providers

As a starting point, it is important to describe the main features of IT training available in the South-West. There are an inordinate amount of short courses on IT available, and these have not been included in the survey. Vendor training has not been described in any detail either, although the issue does arise in the commentary by employers. The two largest providers of vendor training are based in North Sydney—*Educom* and *Aspect* computing. A comprehensive analysis of their courses has, therefore, not been included.

Our survey found that the South-West area is serviced predominantly by two large operators—TAFE and the Interim Technology Training Institute. Tables 2 and 3 provide a (highly) condensed directory of the main courses (leading to a formal qualification) offered by the public (TAFE) and private sectors. The table is not intended to be a comprehensive directory of IT training available in the area. It is included for comparative purposes—so that the main features and delivery mechanisms of the providers can be considered.

The Southern Sydney Institute of TAFE operates from the colleges of Padstow, Lidcombe, Liverpool, Bankstown and Campbelltown. Although Campbelltown is not included in our regional description, it does form part of the same institute network, and so has been included.

The public and private providers have similar conceptions of the IT industry. Tables 2 and 3 show that the program of IT courses offered by the Interim Technology Training Institute and TAFE share broad similarities in content. The majority of courses target IT positions at the entry level. Both providers strongly emphasise the need to provide a balance between technical proficiency and general interpersonal/workplace skills. The broad vocational areas of programming, technical and user support, network support and 'computer user' are targetted by both providers also.

Table 2: Directory of mainstream TAFE courses in information technology—South-West Sydney

Course	Vocational area	Course description	Delivery arrangement
Computer user applications Certificate III Australian Qualifications Framework (AQF) (3601)	Computer user	Stand alone Certificate III, or stepping stone to Certificate IV. Year 12 requirement, or Year 10 with some bridging courses in Maths and English.	FT 21 hpw—.5 yr PT 10.5hpw—1 yr (Total 380 hrs)
PC and network support Diploma (AQF) (3612)	Technical and user support Network technician, LAN administrator, Help desk operator	Skills to develop, implement and evaluate a product or service (for example, set up a LAN, establish an information services division), manage the hardware and software of a business, provide user support through the provision of user documentation, training and help desk procedures.	FT 22hpw—2 yrs Lidcombe, Liverpool, Padstow, Campbelltown
PC Support Certificate IV (AQF) (3602)	PC support specialist	Part of structured framework of articulated courses enabling achievement of a qualification from Certificate III in IT through a number of Certificate IV courses to a preferred diploma on chosen career path.	FT 22hpw—.5 yr 396 hrs Campbelltown
4GL & Database programming Certificate IV (AQF) (3606)	4GL applications programmer or database programmer	Skills in fourth generation application development and relational database and use of CASE technology implementations in multi-user mid-range to large systems, including client server systems. Project management skills, team building, participation skills and interpersonal skills.	FT 20 hpw—.5 yr PT 10 hpw—1 yr 360 hrs Padstow
Applications Programming Diploma (AQF) (3613)	Computer programmer and applications programmer	Develop and implement software applications using structured programming techniques and languages and one or more of the fourth generation and object-orientated methodologies and languages. Students develop, document, implement and present a fully operational software application for a real business problem.	22 hpw—2 yrs Padstow
C Programming Certificate IV (AQF) (3607)	Applications programmer	C programming work most often applied to Unix environments.	FT 20 hpw—.5 yr PT 10 hpw—1 yr Padstow

Table 2: Directory of mainstream TAFE courses in information technology—South-West Sydney (cont.)

Course	Vocational area	Course description	Delivery arrangement
Object programming Certificate IV (AQF) (3608)	Applications programmer	Skills in object-oriented and event-driven programming techniques as applied to the design, coding, testing and implementation of application solutions. The course emphasises the information processing needs of business. Students produce a solution for a real life or simulated business. Emphasises project management skills, team building and participation skills, and interpersonal communication skills.	FT 20 hpw—.5 yr PT 10 hpw—1 yr 360 hrs Padstow
IT business systems diploma (AQF) (3615)	IT arts and media program area. IT and telecommunications	Examples include computer systems administrator and business systems integrator.	Campbelltown
IT network support Certificate IV (AQF) (3604)	Network administrator, network support specialist	Network Administration, network support.	FT .5 yr PT 1 yr 324 hrs C'town

Table 3: Directory of courses in information technology offered by Interim Technology Training Institute

Course	Vocational area	Course description	Delivery arrangement
Graduate Certificate in Programming	Experienced applications or system programmers	Not career entry. Skills to design and write object-oriented programs for business or scientific purposes.	537 contact hours 5 months FT, 17 months PT
Certificate IV in Computer maintenance	Operation, use, repair and maintenance computer hardware	Entry level	22 months PT, 8 months FT
Certificate IV in computer operations	Operations, management, technical support	Networking and network planning. Entry level	7 months FT, 19 months PT
Certificate III in Business computing		Entry level. Basic PC skills.	4 months FT, 12 months PT
Certificate IV in microcomputer technology	Network administration, help desk, training and software support	Entry level	7 months FT, 22 months PT
Certificate IV in programming technology	Trainee programmer	Entry level	9 months FT, 27 months PT
Diploma of Business programming	Knowledge computer operating systems, networking and maintenance	Entry level	32 months PT, 10 months FT

The delivery approaches of the public and private providers had two common features:

- the focus on the 'individual' and the 'professional' featured in the Interim Technology Training Institute and TAFE descriptions of IT workers. The general philosophy of the Interim Technology Training Institute reflects this in the 'self-directed' learning approach (to be discussed in more detail shortly). The TAFE representatives described the industry as characterised by the 'enthusiast professional and consultant':

  There is not a training culture in the industry. Employers are not prepared to give the time off required for training, so most people are self-taught. This explains the popularity of our night-time courses.
  (IT teacher—TAFE)

  IT enthusiasts are young, individualistic, and prepared to spend enormous amounts of their own time and money getting across the programs. In this environment, employers are able to get the best value for money, and do not need to focus on supporting training.
  (director—TAFE institute)

  Now that you are in the professional world, the emphasis changes. Here we assume you want to learn, because you want to be able to do a job in your chosen field and you want to be successful.
  (excerpt from the Interim Technology Training Institute: 'Professional excellence program: A student's guide to the Interim Technology Training Institute')

- the importance of delivering IT training that incorporates 'customer-service' skills:

  The IT industry is divided. We are in an era when all of the technologies are converging. For example, IT people perceive themselves as professionals therefore they are often not 'open' to training and are not keen on 'on-the-job' training ... The industry itself is going through a culture change from a professional to a service industry ... they have not seen themselves that way before.
  (TAFE sector representative)

  The image of the IT industry is changing. IT people were once perceived as Moses—standing with the tablet—dispensing the holy knowledge to the unworthy. Now, everyone requires IT knowledge and the image of the industry is being de-mystified.
  (Interim Technology Training Institute representative)

Interim Technology Training Institute

Delivery method

The most distinctive aspect of the Interim Technology Training Institute's approach is its delivery method. At the commencement of a course, students are required to sign a contract/agreement outlining their rights and responsibilities. The philosophy of the Interim Technology Training Institute and its method of delivery are focussed on the individual:

The key to my better future is not the world outside. It is the world inside. it is ME.
(an Interim Technology Training Institute 'hint for achievement')

The delivery method for courses also reflects the individual focus of the institute's philosophy. There is no concept of a 'class', nor any regular lectures or tutorials following a standard semester pattern. All training modules are computer-based, and the learning experience is entirely 'self-paced' or 'self-directed'.

Students achieve competency in one module at a time—they do not study units simultaneously as students do in the TAFE or university system.

The training experience is intended to simulate an Interim Technology Training Institute work environment as much as possible. Students develop their own study timetable and book 'shifts' in the training room accordingly. Modules are completed entirely through computer terminals:

At other places you will have lectures, tutorials, workshops on maybe four or five subjects a week, in half a dozen different rooms. At the end of the term there are four or five

examinations within a couple of weeks of each other. Next term you start the process again. Everybody in the class starts on the same day. Everybody finishes on the same day. It all works to a timetable, and if you miss a day, it is gone. You have to borrow the notes or do extra reading to catch up. At the Interim Technology Training Institute, it's different. Students start their courses at any time throughout the year. (Interim Technology Training Institute representative)

Training environment

The training environment also reflects the focus on the individual student, rather than by a group-learning experience. Each student finds an available computer terminal for a work 'shift'. The shift is designed to simulate a work environment. Students are required to adhere to a dress code (business attire), and shifts (morning, afternoon and evening) must be attended. Students choose a regular shift, e.g. five mornings or two evenings per week. Absences or variations to the shift arrangements can only be approved through a supervisor or instructor (in the same way that employees are required to apply for leave and to provide medical certificates for absences). The training facilities are open on weekends for students to 'work' shifts anytime from 8 a.m. to 10 p.m. every day, and are only closed during public holidays.

An instructor is on duty throughout a shift and assists where students request additional assistance. Supervisors do not intervene or co-ordinate the movements of students, unless students specifically request assistance.

Training content

All of the Interim Technology Training Institute courses emphasise a balance between technical skills and general workplace and interpersonal skills—termed 'professional excellence' modules. All courses target the entry level, with the exception of one course in advanced programming.

The latest technology is not a strong component of their course materials:

> *We do not train in the very latest technology because as soon as a course is finished it would be out of date. We train in that technology which the bulk of workplaces are using—we cater to the 70 per cent of the workforce. Only 30 per cent of workplaces are using the very latest technology—and that is not our target market.*
>
> *We see ourselves as developing the skills of people in a customer service industry not just delivery programmers.*

Students

The cost associated with the courses means that the typical profile of a student is mature, in their late 20s (or above) and seeking a career change.

Fees and additional services offered by the Interim Technology Training Institute

The most important difference with the Interim Technology Training Institute courses, when compared to TAFE mainstream courses, is the fee structure. A generalist introduction to computing costs the participant approximately $5000. Fees for computer operations and microcomputer technology courses are approximately $9000 each. Those for computer maintenance courses are around $10 000. Programming technology, business programming courses have fees in the range of $11 000–$13 000.

The Interim Technology Training Institute also offers a job placement service on completion of a course. There is a designated placement adviser who liaises with local industries to find employment opportunities for graduates.

TAFE

The qualitative material for TAFE was collected through focus groups with IT teachers, interviews with head teachers of IT departments, and directors of TAFE colleges.

Delivery method

TAFE operates on a semester timetable with a regular pattern of lectures and tutorials. Although individual colleges modify the course program and delivery method, most colleges follow a very similar pattern of delivery. Students enrolled in courses are required to study multiple subjects simultaneously. The learning experience combines team-based (tutorials/lectures) and individual-teaching exercises (projects/case studies, fieldwork).

Students

The student base varies depending on the location and curriculum emphasis of the college. Colleges reported a mix of students—mature age, those 'just out of school', and unemployed people.

Opinions vary widely on the role that TAFE should play in the IT sector. Some teachers perceive the access and equity priorities to be the greatest priority for IT education in TAFE. Others see potential for TAFE expansion in the IT area. The attitude, qualifications, interest and experience of teachers seem to play a great part in the curriculum emphasis of the individual college.

> *We have a broad student base. A considerable number of university graduates in IT come to TAFE to study IT and develop their workplace skills. We are better at delivering and developing the workplace relevant skills. Our teachers are highly qualified and able to provide IT training to a high standard and in a relevant way.*
>
> (comment by head teacher—focus group)

TAFE open training and education network (OTEN)

Although OTEN does not confine its operations to the South-West area, it has been included because it is available to students anywhere in Australia (including the South-West). IT students comprise a minute proportion of all students studying through OTEN (of which there are 32 000 students Australia wide). The delivery method used by OTEN is more similar to the model used by private-training providers—e.g. ratio of teachers to students is 174:1 and full-time teachers are required to 'manage the learning experience' while marking and assessment is performed by outsourced teachers. There is a strong emphasis on individual projects, with 'virtual classroom' exercises forming the main part of tutorial or group-oriented teaching.

General commentary

TAFE teachers believe they are performing well in the IT sector in general terms and are happy with the standard of courses delivered:

> *TAFE is performing well. We have very high success rates for our graduates.*
>
> (head teacher A—TAFE)

> *Employers prefer TAFE because they know we can offer the workplace relevant skills that university cannot.* (focus group—IT teachers and head teachers)

> *Our courses are always extremely popular. We always have to turn away approximately half the applicants because we simply don't have the places available.* (head teacher B—TAFE)

A number of specific areas of concern were highlighted by TAFE teachers

- The role for TAFE in the area of IT training is not well defined.

  A director of a TAFE institute described TAFE as being caught between a rock and a hard place. In the course of the interview, IT was described as being the 'epitome of this dilemma':

  > *It is the dynamic nature of emerging demand that poses the most significant challenge to the policy makers and administrators attached to public education systems. This is the 'hard place' of educational products with short life cycles, high costs of production and delivery, and the high risk of being overtaken by a market that moves faster than the traditional providers are able. These factors bring with them new resource management challenges.*
  >
  > (director—TAFE institute)

  Some TAFE teachers saw the access and equity concerns as being paramount to TAFE's charter and that the spirit of TAFE, particularly in the IT field, meant working to deliver opportunities to students who would not otherwise have access to IT training and qualifications. These comments from three different TAFE teachers show the range of expectations about TAFE's role:

  > *The big benefit of TAFE is that it provides free courses. We see ourselves as providing to a market that otherwise would not have access. We cater to the generally not bright student.*
  >
  > (TAFE teacher)

  > *Our standards are comparable and better than those offered elsewhere and are to a high level of technical proficiency.* (TAFE teacher)

  > *The current model in TAFE is that TAFE provides the generalist IT education, and then people go and get the more specific training themselves. TAFE provides an excellent generalist education in IT. We give skills that can apply across a number of types of programs.*
  >
  > (TAFE teacher)

  Others perceived the problem of TAFE as being one of image more than reality. Many of the IT teachers interviewed felt that the criticisms levelled at TAFE are unfair:

  > *The facilities in TAFE are excellent, but industry do not see this. They see TAFE as being inflexible and out of date ... TAFE suffers criticism for not delivering—but this type of workplace relevance is not demanded from unis to the same extent.*
  >
  > (representative from TAFE sector)

- The high level of individual college discretion over course delivery and curriculum means that there is an inconsistency in the delivery of IT training.

  The courses delivered vary depending on the skill and qualification levels of staff at particular colleges. Some colleges have strengths in programming; others emphasise the support and maintenance IT skills.

- There should be more communication generally between industry and education providers.

  Most of the TAFE interviewees agreed that TAFE needs to be aware of industry requirements to ensure that training remains relevant; however, there was considerable debate over how this might happen.

  One head teacher admitted having very little knowledge of local labour market needs:

  > *I don't know where our graduates end up. I know we have high success rates with graduates finding employment, but I am not sure where.* (TAFE IT head teacher)

  Other teachers adopted a more proactive approach in exploring the needs of the IT industry and the training required:

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The industry should be more actively involved in planning its own training requirements and individual businesses should be encouraged to work with the education sector to plan their training needs. The problem here is that program manufacturers in IT often have their own training which is supplied with the product. The answer here is to have education providers working with these manufacturers too. In this way, they can anticipate new and emerging products and training needs. At the moment, everyone plays a catch-up game and the system is failing. (TAFE institute director)

Others are pessimistic about the ability to negotiate partnerships with industry because of the diverse expectations of employers:

Employer rhetoric states they desire generic workplace relevant or soft skills. However, employers continue to pay mega bucks for Microsoft qualifications. Training practice does not reflect industry practice. (TAFE representative)

A number of specific suggestions were offered by the interviewees:

- TAFE move into the area of job placement services, 'this would ensure that we keep in touch with industry contacts'.
- Each TAFE needs a central point of contact (like a business consultant) to liaise directly with industry. 'Industry doesn't want to deal with ten different people for every aspect of negotiation. They want one person to be the one point of contact. There are too many players in TAFE' (TAFE IT head teacher).

❖ There is debate over the commercial role that TAFE should play. TAFE Plus has been a highly successful venture for TAFE, particularly in the IT field. All of the TAFE colleges emphasised the financial challenge that they face in the IT area. Keeping pace with technology and ensuring that teachers receive the training required is very expensive. TAFE Plus courses have become an essential part of the funding base of many colleges, and mainstream IT courses could not be financed without them. There appears to be universal praise in the TAFE sector for the commitment that teachers give to ensure that commercial courses keep running:

We have a strong commitment from our teachers here. They deliver the paid courses in their own time, at night, for no personal benefit. This money is essential for the college—we could not exist without it. (focus group—IT TAFE teachers)

There appear to be two schools of thought on this issue. One school envisages stronger partnerships directly with industry. A possible model might be the IBM partnership with the University of New South Wales, formed in 1987. It was a profitable venture for industry, and, it was argued, academics benefitted from the close contacts with industry and 'real world' experience. Under this system, the academics delivered training and IBM gave the technology to the university at no cost.

Some see this type of partnership as the only way for TAFE to survive in the IT training market:

The public system often suffers unfair criticism from employers. It is very difficult to expect the education sector to cover the ground necessary to keep pace as new products emerge if industry isn't prepared to be part of the training partnership with education providers. You cannot expect education and government to meet all these training costs without some input or commitment from employers. (director TAFE institute)

Others perceive a direct relationship between education institutions and industry as being 'too close for comfort'. A number of TAFE representatives were highly critical of the 'shonky' qualifications offered by the vendors, for example, and believed that a closer relationship may harm TAFE's image:

Vendor training is just about learning specifics and it is not understanding that is transferable to other programs. (TAFE teacher)

At the Padstow Institute of TAFE, a working model of a partnership between industry and TAFE is in operation:

A partnership between industry and TAFE

The Southern Sydney Institute's Padstow College IT teachers have formed a partnership with Oracle New South Wales Education Centre (part of the leading software vendor—Oracle Corporation).

As part of the alliance, six TAFE New South Wales teachers are to become Oracle Education trainers (i.e. will obtain Oracle certification). The partnership will be both ways—trainers will deliver Oracle's education courses as customer demand requires—and may be required to deliver training to Oracle clients anywhere in the Asia Pacific region. In turn, Padstow College -TAFE will potentially offer Oracle courses in the TAFE New South Wales curriculum.

'In the process of conducting these courses for Oracle customers, trainers have the opportunity to view first hand how industry is using these products ... We can now offer participants in IT training more options. We will always train generic technical skills in line with nationally accredited curriculum, but now we can offer expert training in the skills required to make the best use of Oracle products' (Eugene Penna—quoted from TAFE Link—TAFE Plus newsletter for industry).

- The TAFE system is inflexible and unable to meet training delivery needs in the IT sector:

  It takes two years to do something that should take ten minutes. In IT this is a real problem. If it takes six months to develop a course on the internet, then by the time you are finished the course is out of date. (TAFE representative)

  The IT industry is characterised by small employers; however, the inflexibility of TAFE does not allow us to cater to this sector. (TAFE representative)

- The resourcing issues for TAFE are considered to be a significant impediment—e.g. the costs of software, the training costs for teachers are particularly difficult for IT departments in TAFE:

  I get $5000 a year for training all of my teachers in IT. You can imagine how little you can do with $5000 in an area like IT! (TAFE head teacher)

A number of people referred to the high level of commitment from individual TAFE teachers who were prepared to work in their own time:

I have a responsibility to teach at least ten hours a week, plus the administrative duties associated with my job, management etc. All of the extra work to develop these ideas has been done in my own time and my own commitment. Nothing about the system supports this. It would never have happened without my own personal commitment and vision.

(IT head teacher)

Teacher A: 'Why do we stay here?'

Teacher B: 'Must be the money'.

Everyone laughs

Teacher A: 'No. We stay here and teach the extra courses in our own time because we are committed. Some of our students go out, and earn $70 000 in their first job. We don't see anything like that kind of money'.

(focus group discussion: IT teachers and head teachers)

Issues for training users

A mixture of small and large businesses was interviewed for this study. There are a limited number of businesses considered to be 'computer companies', or those businesses strictly considered to be in the IT industry, operating in the South-West area. Local businesses are characteristically in the manufacturing and retail and wholesale trade industries. Our interviews, therefore, are an attempt to reflect IT positions which are 'typical' for the area. The IT managers and human resource personnel of three large businesses and two small businesses were interviewed, that is:

- 1 large financial institution
- 1 large company in the food and beverage industry
- 1 large health organisation and medical research facility
- 1 small business providing network support services, maintenance and repair services
- 1 small computer business specialising in the provision of programming services

The IT departments of these businesses are in the business of 'customer service' (as they themselves describe), rather than product development or sale of IT products.

The interviews explored the following five main areas with these businesses:

- the perceived impact of globalisation on their business, and the demand for IT training
- the type of IT training currently used (and why)
- their impressions of the quality/quantity of IT training currently available
- their impressions of the CB system
- any areas of skill shortage in the IT area

The perceived impact of globalisation

The small businesses interviewed did not identify globalisation as a factor influencing their business:

I don't really think that globalisation is relevant to our business—we supply services to the local area, we are not in the business of developing products—so we are less vulnerable to these kinds of pressure. (small business providing IT services)

Two of the three large companies interviewed stated that globalisation had affected the organisation's ability to find appropriately skilled IT staff:

We are dealing with very sophisticated technology in our organisation, and we have found it difficult to attract and maintain staff. We have a stated policy of trying to reduce the numbers of consultants we use ... we have found it necessary to strike enterprise agreements in order to be able to offer market competitive salary packages that are well above the award.

(large health and medical research organisation)

We currently have a permanent staff of 35. We have six vacancies that we have not been able to fill—one is in a very marketable position a Unix administrator and we are offering $55 000. The person who was in this job has gone to a position in Hong Kong offering $90 000, so you can see what we're up against. (large health and medical research organisation)

We are going to start advertising our IT positions overseas in the hope we get more experienced people. This, of course, creates other problems because people may have the technical proficiency and experience but have language and communication difficulties. The standard and quantity of training is not the problem—it is finding people with sufficient workplace experience. You can have all the knowledge in the world, but you need to maintain them to be useful in a business sense. (large financial institution)

The type of training currently used and impressions of quality

Employers relied on a combination of three main techniques to obtain the IT skills necessary for their businesses—on-the-job training, vendor training or contracting people with specific skills for short periods of time:

For basic computer use needs we almost exclusively do all our training on-the-job. In areas where we need specialised technicians we purchase those skills into the business in the form of contractors or consultants (this would be the majority of our IT staff currently).
(small company)

The companies in the financial sector and the company in the food and beverage industry had both outsourced a large proportion of their IT functions. One of these large companies had recently merged with a larger corporation and explained that the decision to outsource was based on increasing pressure to meet tight deadlines because of new management.

Despite their reliance on vendors for a large proportion of their training needs, employers expressed strong concerns about the quality of training provided by vendors:

I wouldn't let anyone with a Microsoft qualification near one of our machines. Those qualifications are about passing an exam, they do not focus on the broader business model.
(small company)

Concerns were also raised about the range of courses available and the difficulty that workplaces face in judging the quality of courses.

In general terms, the employers were highly critical of the focus and content of the mainstream education and training available in IT, particularly tertiary IT courses:

Educational institutions are not turning out the relevant skills—customer service, business problem solving and organisational skill ... the 'engagement' skills—the ability to work with people—this is very hard to find. (large business—financial sector)

It is not worth our while to hire graduates ... I used to be a manager for X (computer company) and we would take in some 80–100 graduates from university. Every graduate had to have an intensive workplace orientation for three months, and then they each had a personal mentor for the following 12 months. This is a recognition that when you leave education very few people are ready for work ... it is not a question of intelligence and willingness.
(large business—financial sector)

None of our IT technicians, and I am talking about extremely sophisticated programming skills, are tertiary educated or TAFE educated. We need the people that can demonstrate the workplace experience and recent workplace experience more importantly.
(large business—food and beverage sector)

When asked about their more specific experiences, only one employer made reference to having considered, and subsequently hired, TAFE graduates:

In general terms TAFE graduates have shown themselves to more readily adapt than university graduates to new workplace environments. University graduates are too academic.
(large employer—financial sector)

They were generally more receptive to the idea of TAFE training—perceiving it to be more workforce-relevant than tertiary study in computer science and IT. Employers showed

limited understanding of the actual courses available in TAFE and the possible relevance to their business:

> *TAFE graduates appear to be a bit more aware of a real work environment ... I don't really have much knowledge of the services that the local TAFE provides. I should find out because it could be a cheaper way of training for us.* (small employer)

Overall, the IT managers interviewed expressed dissatisfaction with the training available and with current opportunities to articulate their training needs. The Information Technology Educators Network (ITEN) is an industry initiative to overcome some of these problems and give industry a voice.

Articulating IT training needs: An industry solution

ITEN was formed in 1998 and has more than 25 member companies including Woolworths, Qantas and Bankers Trust. The network began as an 'informal gathering' or support network for IT educators and training managers.

'IT is a particularly difficult area to keep up to date with all of the training available, what training is relevant and best for your organisation. IT training managers often feel isolated in their jobs. We believed we could benefit from sharing information with other companies about their IT training needs and experiences' (ITEN representative).

The network formed when IT managers began liaising over the availability of vendor training. 'For example, vendors don't tend to run courses unless there are sufficient numbers of people requiring training. IT training managers started liaising with each other to try and synchronise the timing of training so we could get the training we needed from the vendors. Now, the network has realised that we can collaborate and learn from one another on much wider issues' (ITEN representative).

The group meets monthly to discuss particular topics (often with a guest speaker) and communicates more frequently by email. The group comprises a mix of the most senior level IT training and development managers and training officers.

'This is just our first year of operation, and we see ourselves as being in the fledgling stages. The response we have got so far from the training providers, industry groups has been very positive'. One of the first issues the group has tackled is marketing. 'We don't allow vendors to attend, but are happy to feed the information out to them'. The discussion on marketing helped IT managers to reflect on and better understand the IT needs of their organisation, and to plan training accordingly.

The network is a success because there is a strong environment of trust between members. ITEN has just been incorporated as a professional association and has a code of professional practice etc. All members are very personally committed to exchanging information.

The network convenes on a two-meeting cycle. One meeting is a presentation of an issue and the following month re-convenes to share experiences/ thoughts successes and failures about the implementation of the ideas discussed at the first meeting.

Future issues on the agenda for ITEN

CBT—competencies workshop. 'You can't implement these things in isolation because you're not going to get very far'.

Perhaps more co-operation between TAFE in IT and industry in TAFE 'there is very little visibility of TAFE in IT'.

Perhaps more targetting for small business, which is not so well represented.

Impressions of the CBT system

Only one of the employers interviewed (large) had any knowledge of the CBT system. One employer was aware of the system, but it had not been implemented by the firm in any way.

Skill shortages

None of the employers interviewed indicated any areas of skill shortage in IT. The 'customer service' orientation of the IT departments interviewed means that IT managers are looking for technical proficiency balanced with 'people skills'. These 'soft skills'—an ability to work with people, communicate effectively, understand the business context of IT problems—were all identified as areas of skill shortage by IT managers:

> *In the technical areas, we are not experiencing any areas of skills shortage. The greatest skill shortage in IT is in the area of people skills ... in the IT area value-adding means the people skills that employees can bring to a workplace, not just the technical skills.*
>
> (financial institution—IT manager)

Intermediaries

The interviews with intermediate organisations (NACs) revealed limited communication between employers and training providers in the IT area. Across all of the NACs interviewed in the South-West area, only three IT apprenticeships/traineeships were in operation—all in Certificate II (computer applications). One NAC manager explained that the nature of local industry—comprised of manufacturing and small jobbing shops—means that there is no demand for IT traineeships, so therefore is not a target area. One of the NACs interviewed stated they had no interest in the IT area and referred all prospective IT trainees/apprentices to the CBD or North Sydney area.

There is a significant lack of communication and co-ordination between industry and intermediaries. While it is recognised by all interviewees that co-ordination is not currently happening, there is debate over which organisation should be performing this role. There are a number of reasons for the lack of co-ordination:

- The responsibilities of organisations are not clear. It is particularly confusing for employers:

  > *All the ITCs [Industry Training Companies] have turned themselves into GTCs in order to remain financially viable and this has completely confused the market. No one knows who is the appropriate point of contact anymore.* (NAC business consultant)

  > *The few dollars thrown into NETTFORCE was the best money the government has ever spent because it was the most effective mechanism I have seen for getting the information out to employers. The ITABs are no longer funded for this role either. No organisation is actually getting the brochures and information out to employers—that step is gone.*

- The NACs are facing resourcing problems/constraints:

  The basic precondition for an employer taking on a trainee is the employer actually knowing about the existence of traineeships. This is not happening currently. We are not in a position to market the traineeship. We have won the contract to operate on such a low cost that we do not have the resources to develop, update and disseminate materials except via the internet. Any advertising is done on a haphazard basis because of the lack of resources.

  (NAC business consultant)

Key findings

For providers

- Training in the field of IT is very costly to provide, and this creates difficulties particularly for public providers.
- TAFE has a number of options in terms of expansion in the area of IT training. However, the consequences of these options are not being systematically considered because of different priorities held by colleges. Employers are generally more receptive to TAFE IT graduates than tertiary IT graduates, but there is lack of understanding about what is available; for example, partnerships with vendors, relating directly with industry through business consultants, and raising the cost of courses to ensure that teachers are paid industry rates.
- The IT industry is undergoing a transformation toward a more customer-oriented focus and this is causing problems with the emphases on training provision.
- Growth of the training market is not being realised by providers (particularly public providers). It is argued that the system is inflexible, there is a lack of communication between providers and industry, and a lack of appropriate skills in the public system.
- Both private and public training providers are struggling with a perceived inconsistency between employer rhetoric and employer practice.

For training users (workplaces)

- Employers have concerns about the technical emphasis of training and the general standard delivered.
- There is an almost universal lack of understanding among employers about the formal arrangements that might define IT training (e.g. CBT, the training package, traineeships).

For mediating institutions

- There is limited dialogue between training providers and users in the South-West area. The organisations currently responsible for 'mediating' (e.g. NACs) argue that there are significant constraints for them in fulfilling this role.
- The diversity of the IT sector (customer service responsibilities vs. technical skills) is contributing to a lack of co-ordination between institutions providing training, using training and mediating the industry training market.

The labour market on the Central Coast

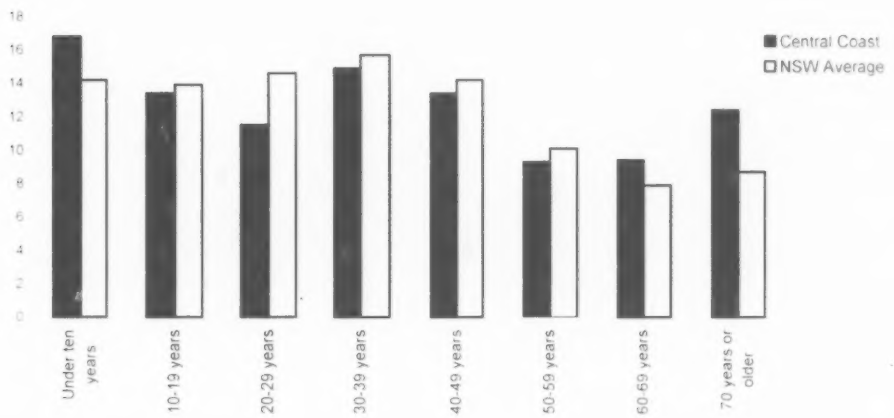
The Central Coast labour market is very different to Sydney. There is a huge pool of available skilled labour comprising those who commute daily to either Sydney or Newcastle. A large proportion of those commuting would prefer to work closer to home than travel up to five hours each day. Some of them would accept a lower wage than they could get in Sydney for the convenience of working closer to home. The following is a description of the Central Coast labour market which shows its distinguishing features.

The Central Coast is defined in the Census data as the local government areas covered by Gosford and Wyong Councils. Gosford Council covers the Southern area of the Coast, while Wyong Shire covers the North to Lake Macquarie. The total geographical area of the Central Coast is 1 854.11 square kilometres (CCRF, *Central Coast at a glance* 1998).

The most recent data available on the Central Coast is the ABS Census of Housing and Population. This data is collected every five years and provides statistical information on every household in Australia. According to the 1996 Census, the population of the Central Coast is 260 839. There are currently more people living in Gosford Shire (144 840) than in Wyong (115 999). Over the last decade, Wyong Shire has grown faster than Gosford, with an increase in population in the Shire of almost 30 per cent since 1986.

The Central Coast is generally considered as a region which has a high proportion of retirees. While it may be true that there are a higher proportion of people living on the Central Coast aged over 60 than the New South Wales average, figure 5 shows that the majority of those living on the Coast are aged 50 or below. Certainly there is a high proportion of people under the age of ten, indicating the popularity of the Central Coast for young families.

Figure 5: Age of population as a percentage of total population



Source: ABS Census of Population and Housing (1996)

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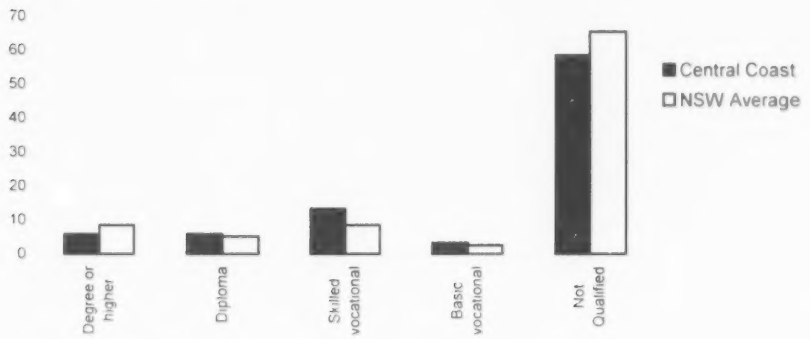
Educational profile

The level of educational attainment on the Central Coast is quite high when compared to the New South Wales average. Figure 6 shows that while a significantly lower proportion of people on the Coast do not hold a degree or higher qualification (5.8%) compared to the State average (8.5%), in all other areas of qualifications the Central Coast has an above average status.

Figure 6: Highest qualification attained as a percentage of total population

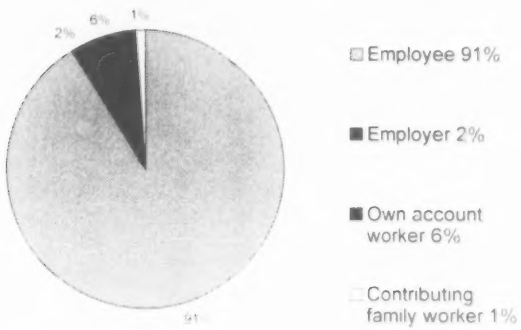


Source: ABS Census of Population and Housing (1996)

Employment

The structure of employment on the Central Coast is similar to that across the State. The majority of workers on the Central Coast are employees, with a small percentage working as own account workers (5.7%).

Figure 7: Status of employment 1996 as a percentage of the labour force

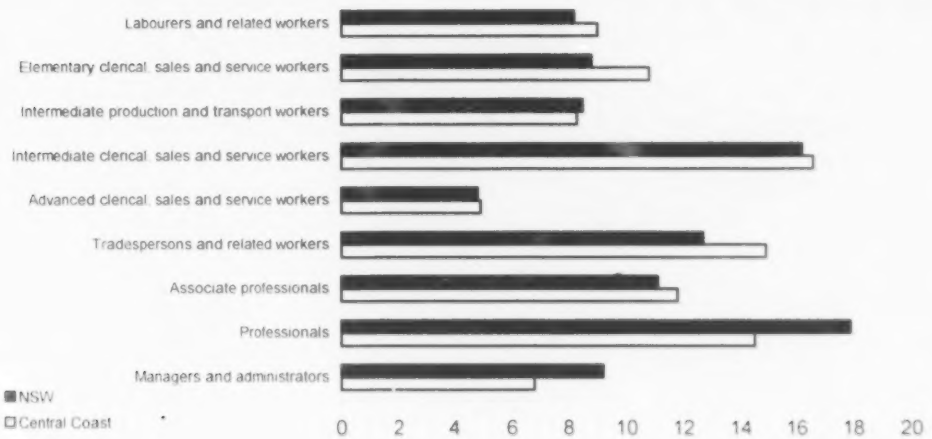


Source: ABS Census of Population and Housing (1996), C-Lib

The Central Coast has a high commuting population. It is difficult to get data on the proportion of those who commute to Sydney or Newcastle for work; however, it is estimated that the commuter population is more than 50 000 people, and approximately 27.5 per cent of the Central Coast population.

There is a significant difference between the commuting workforce and those who work on the Coast. These two groups can be distinguished by occupation—with the locally employed workforce consisting of a large proportion of clerks, and sales and personal service workers; and the commuting population being comprised of higher proportions of business and engineering professionals, managers and other para-professionals. Figure 8 shows that on the Central Coast there is a higher proportion of clerical, sales and service workers than State-wide.

Figure 8: Occupation of workers on the Central Coast and State-wide, 1996



Source: ABS Census of Population and Housing (1996)

Table 4: Industry of employed persons, 1996

Industry	Central Coast	NSW
Agriculture, forestry, fishing	1.4	3.6
Mining	0.5	0.8
Manufacturing	11.7	12.2
Electricity, gas and water	1.3	0.9
Construction	9.0	6.4
Wholesale trade	5.7	6.3
Retail trade	16.5	13.3
Accommodation, cafes and restaurants	4.9	5.0
Transport and storage	4.1	4.7
Communication services	2.3	2.1
Finance and insurance	4.1	4.8
Property and business services	8.7	10.6
Government admin. and defence	3.9	4.3
Education	6.0	6.8
Health and community services	11.0	9.3
Cultural and recreational services	2.2	2.3
Personal and other services	4.2	3.6

Source: ABS Census of Population and Housing (1996)

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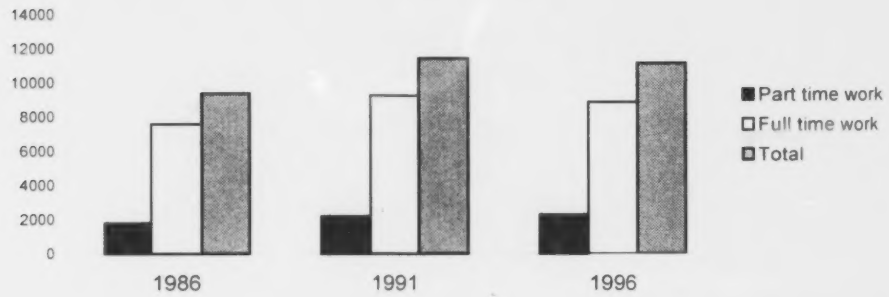
In addition to the high proportion of people employed in clerical, sales and service occupations, a high proportion of work on the Central Coast is in the retail and services sectors. For example, table 4 shows that 11 per cent of workers are employed in health and community services compared with 9.3 per cent across the State, and 16.5 per cent are employed in retail compared with 13.3 per cent State-wide.

Unemployment

Figure 9 shows the high number of unemployed on the Central Coast. The majority of these people indicated that they are looking for full-time work. This is problematic because the types of industries prevalent on the Central Coast are those which use high levels of part-time and casual labour. Table 5 illustrates the high proportion of small businesses on the Central Coast. Taken together, this data does not paint a positive picture for high demand for full-time employees on the Central Coast because businesses tend to be small and to be in industries which are not characterised by a strong demand for full-time employment.

Figure 9: Number of unemployed persons on the Central Coast



Source: ABS Census of Population and Housing (1996)

Type of employers

Examining the size of businesses on the Central Coast by the number of workers they employ shows that those industries which employ the largest number of workers are predominantly small businesses (see table 5).

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Table 5: Number of workplaces by industry by number of employees, 1996

Industry	Number of employees		
	< 5	5-19	20+
Mining	19	7	9
Manufacturing	353	143	61
Electricity, gas and water	7	3	16
Construction	1827	141	11
Wholesale	435	121	15
Retail	1328	476	92
Accommodation, cafes and restaurants	186	98	58
Transport and storage	333	35	13
Communication services	41	1	12
Finance and insurance	247	69	15
Property and business services	1349	209	19
Government admin. and defence	21	13	12
Education	73	46	59
Health and community services	524	150	52
Cultural and recreation services	171	27	15
Personal and other services	374	63	14

Source: Central Coast Regional Development Corporation, *Business Information Series*, no.3, Industry Breakup, <http://www.ccrdc.or.au/BIS-C03>, accessed 14.5.98

The information technology training market on the Central Coast: Case study

In 1996 and 1997 the Gosford and Wyong Councils investigated the region's options for future industrial development. Three possible industries emerged from these investigations—light manufacturing, IT and tourism. It was argued that the Central Coast already had a relatively well developed tourism industry and that investment in a manufacturing future may be unwise given the industry's relative decline through the 1980s and early 1990s. IT was seen as the obvious choice for regional industry development.

At the commencement of fieldwork in the region, it was thought that there was minimal IT activity on the Central Coast. First impressions were that the industry consisted of a reasonable number of IT user firms and organisations (spread across the customary industry sectors of finance and insurance, government administration, property and business services, education and health services) complemented by a modest support sector selling computers and servicing users. However, as fieldwork progressed, it became apparent that there was a moderate number of mainly small and medium operations undertaking medium level and high level IT. There are no precise numbers for IT professionals working on the Central Coast. However, it is estimated that there are more than 200 high level IT specialists currently working on the Central Coast. This includes a number of programmers, analysts and network engineers who work from home offices doing contract work for companies all over Australia.

Both local councils are working together through the Central Coast Economic Development Board and the Central Coast Regional Development Corporation to encourage IT companies to relocate to the Central Coast.

According to these bodies, the Central Coast has a number of features which should attract business to the region, that is:

- it is strategically located between Sydney and Newcastle
- there is immediate access to infrastructure
- land is affordable and close to Sydney
- the services are modern
- there is a large pool of available labour, particularly the commuting workforce
- there is enough land available for companies to expand
- the local governments have offered a choice of different sites with appropriate infrastructure for IT; for example, there have been proposals to set up a telecommuting centre
- the region is promoting itself based on the lifestyle and beauty of the coast

Gosford and Wyong Councils have also changed their administration processes to remove barriers to business relocating to the Central Coast. For example, they have reduced the average time for building approvals to one month. They have also changed Council restrictions on how many people may work in one home office. (The restrictions relate to parking approvals and WorkCover provisions.) The limit has been increased from a maximum of two people working in one home to four.

In the middle of 1998, an *Information Technology Taskforce* was established on the Central Coast. The taskforce was established after concerns were raised by the local governments, business and the community about the high proportion of commuters and the related social impacts of commuting. The taskforce has established a professional group, comprising IT business representatives and consultants, as an annexure. The role of the group is to advise on the implementation of the taskforce's recommendations. The Central Coast Economic Development Board is overseeing the taskforce with input from the Central Coast Regional Development Corporation.

Connect Central Coast is a specific project being run by the Central Coast Economic Development Board. It aims to produce a strategy for IT and telecommunications on the Central Coast. Telecommunications is a growth area for the Coast with a number of call centres, including the NRMA and New South Wales Police call centres, relocating to the Coast. The project is to report in September 1999, providing an audit of the current situation on the Central Coast, including consideration of the future needs of business and the community.

In addition to the growth in call centres locating to the Central Coast, the State Government promised to relocate WorkCover to the Central Coast in 1999. At least 300 people will move into the region with WorkCover, and it is anticipated that new jobs will be created as a result. As well as WorkCover moving, the State Government has noted that there are a high number of public servants living on the Central Coast who commute to Sydney daily. The government, through the Economic Development Board, is developing a telecommuting centre where public servants can work several days of the week instead of commuting. If this trial is successful, the centre will also be available to private business.

In light of the initiatives being taken on the Central Coast with IT, there is an impetus to improve the level and access of training available in the region. Training has been identified by the taskforce as a key issue. Some initiatives are under way; for example, the Ourimbah campus of the University of Newcastle is to offer an IT degree program in 2000. This degree has been designed in conjunction with the Central Coast TAFE and will provide TAFE IT students with easier progression to university.

Levels of information technology

There are three levels of IT activity on the Central Coast. These levels will be referred to throughout this case study.

Low level information technology

These functions and jobs tend to be very IT user intensive; for example, data entry and processing, word processing and basic business and office administration that requires significant IT use.

Medium level information technology

These functions and jobs require more specialised IT skills. On the Central Coast these functions include PC and network support, usually within larger organisations.

High level information technology

These functions and jobs include system design and administration, business analysis, systems analysis, programming and software design.

Issues for training providers

Training providers, both public and private, report that on the Central Coast there is a low level of employer commitment to training. The majority of businesses on the Central Coast are small and have very tight profit margins. Small employers claim that they do not have the capacity to either pay for a course or to allow employees time off the job to attend a course. Trainers claim that employers prefer to employ someone who already has the skills, rather than train a new employee.

The majority of people attending IT training courses on the Central Coast bear the cost of this training themselves and study in their own time. At the lower end of IT training, including basic office administration and business courses, students are most likely to be school leavers or women looking to return to the workforce. Typically they will attend either a private college or TAFE, depending on their financial status. Most high end training used by businesses on the Central Coast is conducted in Sydney.

TAFE on the Central Coast

TAFE currently has approximately 135 students enrolled full time in IT courses and about 50 part-time students. The majority of full-time students are school leavers. Those studying part time are usually working and looking for a career change or are doing IT training out of interest.

TAFE has a strong role in IT training because most trainers and employers accept that there is a need for basic IT training to be provided by either university or TAFE. TAFE is often considered as more relevant for background training in IT because the courses it can offer are shorter. A common criticism of university courses was that by the end of a four-year degree, because of the changing nature of IT, half the subjects studied are obsolete. TAFE has also sought to improve and ensure the industry relevance of its courses by developing a *return to industry* program for staff and through the employment of industry practitioners as course teachers.

TAFE respondents reported that it is often difficult to teach students with no relevant work experience. If students cannot relate what they are being taught to workplace experiences then the course must be grounded in theory. This is of concern because the theoretical nature of some IT training at TAFE and university is one of the most common criticisms industry has of TAFE and university training.

The importance of work experience in IT training points to the important potential role that can be played by traineeships and new apprenticeships in IT.

Flexibility in TAFE IT training

Several years ago, TAFE ran an IT course in conjunction with the Australian Computer Society. This course was designed to get people into industry quickly and arose out of a shortage of computer programmers at the time. Students were given intensive training at TAFE for several weeks and then were employed as programmers in the industry.

After two years work experience they had the option of going back to TAFE and studying systems analysis. This training was seen as far more effective because, after gaining some knowledge of the industry, students were able to better understand the more complicated parts of their training and relate it to 'real world' situations.

While employers and trainers agree that there is a need for students to learn the basics, including the theoretical foundations of IT, employers place great weight on vendor certifications such as those provided by, or licensed from, Microsoft or Novell. (Although large employers still preferred to hire people with a degree, not necessarily in computer science.) Currently these vendor certification courses are not offered on the Central Coast. However, in response to demand from both business and students, The University of Newcastle Ourimbah campus is aiming to provide Microsoft Certified Engineer (MSCE) training in the near future.

Flexible delivery of training

The IT training market is required to change as rapidly as the IT product and service markets. One of the common criticisms of TAFE and university when compared to the private provision of IT training is that they are not as responsive as private providers to market demand. A number of reasons were offered for this. First, private providers are market driven. They get little, if any, public funding and therefore rely on providing training in areas of popular demand. In comparison, TAFE has a high proportion of public funding and is therefore not under as much pressure to concentrate on popular offerings.

According to private providers, TAFE also has an established name, and there is a perception on the Central Coast amongst employers and trainees that TAFE qualifications are better than those attained in a private college, even though the skills learnt may be the same. This is very much the case for low end IT training such as business administration courses.

Second, TAFE and universities have more bureaucratic structures, which implies that they may often be slower to introduce changes. Respondents noted that the structure of TAFE is more flexible than the universities but nowhere near as adaptable as those of private providers.

Finally, TAFE and the universities work on a system of semesters or terms. As a result, their enrolment periods are not always flexible. One attraction of private providers for employers and students alike is that most have a system of 'rolling enrolments' where people can commence a course at several points during the year.

However, in comparing TAFE and private provision of training, it must be noted that on the Central Coast there are two relatively distinct industry training markets. Private providers in IT are reasonably new to the Coast. They grew out of the gaps in the public provision of training. Private providers cannot viably offer the longer term courses offered by TAFE because they would not be price competitive. This is simply because of the level of public funding TAFE receives. Nor can TAFE on the Coast break into the part of the industry training market serviced by private providers. While TAFE New South Wales is moving to flexible provision of training and therefore into the part of the industry training market currently serviced by private providers, it is not likely that Ourimbah TAFE will make a significant mark on this area in the near future. TAFE on the Central Coast is stretching its resources to service the demand for the longer term IT courses and does not currently have the resources to move into market driven, flexible provision of training.

Traineeships

There are not many IT trainees on the Central Coast. All the trainees identified in this case study were studying at the low end of IT, business and administration. Some IT companies at the higher end indicated that they employed what they called 'trainees', who were TAFE or university graduates employed at a lower wage while they became familiar with the organisation. These 'trainees' had no formal entitlement to training.

The Central Coast Group training company (CCGT) employs a large number of apprentices and trainees, but it focusses on apprenticeships and pre-vocational training in the trades areas. While there is a high interest in studying in lower level areas of IT, most of the students

who pass through CCGT are not trainees—although they may find employment during their course.

Traineeships in general are not popular on the Central Coast. Training providers reported that several years ago the traineeship system was widely abused in the area. This has left traineeships in low regard with a number of employers on the Central Coast. On the other hand, CCGT reported that there are a number of employers on the Coast who are committed to employing trainees and will employ a new trainee each year. However, the capacity of employers to take on trainees is lower on the Central Coast than in areas like Sydney purely because the majority of businesses on the Coast are small.

A number of training providers struck a cautionary note and indicated that employers may be tempted to use trainees as cheap labour and not to provide them with the required training. Private providers noted that the NACs had strict guidelines which were designed to ensure that trainees received adequate training.

Providers noted that IT employers typically prefer employees to train out of normal business hours so that trainees would work five days and attend courses at night or on weekends. This attitude seemed to underline the point that employers are driving the demand for flexible delivery of training on the Central Coast.

The majority of training providers agreed that a traineeship in IT was a good idea in principle. They supported the concept because employers want graduates with practical experience. However, most providers did not expect that employers will quickly accept the IT traineeships. Providers acknowledged that to get employers on the Central Coast interested in traineeships in IT would require a profound culture shift.

Competency-based training

All the training providers indicated that they used CBT; however, the degree to which qualifications and courses were based on competence varied. TAFE provides all students with a rating of 'competent' or 'not competent'. Private providers still tend to rank students according to their performance but base this rating on a demonstration of the required skills.

Training providers raised a number of criticisms of CBT:

- CBT does not allow excellence to be identified because it discourages relative discrimination in assessment
- employers want excellence and 'degrees of competence' identified
- providers suggest that in high level IT training it is not possible to break skills down to meaningful competencies. IT courses build on the skills already learnt and cannot be tested in isolation because to complete a task a student may have to draw upon a number of different skills. In this sense, tasks cannot be defined as single competencies
- there is some confusion about what 'being competent' actually requires. It was suggested that teacher approaches to what constitutes competency may vary

Future of information technology training on the Central Coast

Most training providers agree on the direction of IT on the Central Coast. They see low level IT as becoming an integral part of business. While the Coast may have lagged behind in terms of the use of technology, employers are now realising that their competitive advantage lies in increasing efficiency through using the relevant computer systems. Instead of training themselves in these skills, they prefer to employ a young, recently trained person who has all the skills relevant to their business needs.

Providers vary in their assessment of the likely future level of demand for high level IT training on the Central Coast. There was also some suggestion that the demand for lower level IT training may decline as the basic standard of computer awareness amongst school leavers continues to rise.

Issues for training users

Low level information technology employers

The majority of low level IT jobs are filled by people who have attended a private college and paid for their own training. On the Central Coast there is an oversupply of people with low level IT skills such as business administration qualifications.

There are a large number of small businesses on the Central Coast which require employees to have some level of IT skills. Usually these employees work in office administration. Small employers cannot afford, or are unwilling to bear, the cost of training their own staff and will tend to hire the person with the skills they require. This is possible partly because of this oversupply of qualified people.

In addition to the small businesses using low level IT, there are a number of large companies on the Central Coast which also employ people with low level IT skills. Besides Sara Lee and Masterfoods, the most obvious of these are labour hire firms.

Labour hire firms place people in lower level IT jobs on the Central Coast in reasonably high numbers. The bulk of their business comes from large and medium-sized firms. The majority of smaller companies have a tendency to employ a friend or family member when they need short term assistance with business-administration-related work. They cannot justify the cost of using a labour hire firm, particularly when there is an abundance of people on the Central Coast looking for this type of employment.

Because of this oversupply of qualified people, labour hire firms, as employers, are able to hire highly skilled staff. Anyone applying for work without the relevant skills is asked to re-apply when they have acquired them. Placement staff are trained to be 'multi-skilled' so they can be placed with as wide a range of employers as possible. This training is generally offered to staff at a discounted rate, or for no charge; however, employees are typically not paid during their training.

Medium and high level information technology employers on the Central Coast

Table 6 shows how IT on the Central Coast can be divided into a number of different categories. The first is what has been termed medium level IT and includes employers such as University of Newcastle and the Area Health Service. Their involvement in IT on the Central Coast is in maintaining the computer networks at each institution. This type of organisation is likely to employ between ten and 20 IT workers. The second group includes companies which are involved in very specific and higher level IT research and development. These companies are quite similar in many ways to the multinational company branches set up on the Central Coast, but, unlike some of the multinationals, they do not have a strong commitment to training people in generic, transferable skills. The third category includes large domestic companies (of which there are few on the Central Coast). These companies generally purport to have a stronger commitment to training.

Table 6: Summary of Central Coast IT employer categories

	Medium level information technology	High level information technology		
	Small company, medium level IT	**Small company, high level IT**	**Medium local company (25+ workers)**	**Branch of multinational company**
Export	These companies do not export. They are local service providers.	All these companies export worldwide, including to USA, Asia (China, Indonesia, Malaysia, Singapore, Korea), India, New Zealand, Canada, South Africa.		
Global competition	Not much competition in this area of IT—it includes network and PC support functions. Employers include the Area Health Service and Ourimbah Campus of Newcastle University.	There is some global competition; however, these companies develop highly specialised products and competition is limited. Most competition comes from large USA-based companies.	These companies are in a very specific market; again they are not exposed to high levels of competition owing to the highly specialised nature of the product.	Varying levels of global competition depending on the product or service provided. Some companies have to keep in the game by constantly improving products or creating new markets for new products. Others have limited competition because the product is distinct.
Labour supply	High levels of supply in this area. There is a large pool of qualified commuters to recruit from.	Very restricted. Skills in this area are usually very product specific. Will recruit overseas if necessary.	Need very specific programming skills—have trouble finding staff.	Need specific skills but train people up and find that people want to work on the Coast.
Use of contractors	Little use of contractors.	Will use contractors based locally or overseas.	Mainly use permanent full-time staff.	High use of contract workers. Usually these contractors work full-time hours.
Training	Vendor training available to staff. Staff get on average 3 days training per annum.	Training is very product specific. Most training is in-house because there are not courses in these specific areas. Some training will be done overseas.	Have training budgets train staff in specific areas; for example, the programming language used.	Vendor training provided to employees. TAFE used for basic IT skills. Employees trained overseas if necessary.

Globalisation

As noted above, there are varying degrees to which IT companies on the Central Coast are exposed to the effects of globalisation. While all the high level IT companies export, not all are equally affected by global competition. The more specialised the product, the lower the level of competition may be for that product.

One important impact of globalisation on the Central Coast is the reported phenomena of skill shortages at the high end of IT. These shortages are such that a number of companies hire overseas workers on contract. However, employers noted that having workers based all

around the globe is not an ideal situation for developing products. Development (software) is ideas-based work which benefits from the personal interaction of staff:

> *Corridor conversations can be the start of great projects and so a company needs to develop a core and cannot spread itself too far.* (multinational software development company)

Another negative impact of globalisation on IT companies based on the Central Coast is that these companies are usually very small and find it difficult to compete against large multinational companies. The advantage for Australian companies is that a high proportion of organisations requiring IT services will use a service relatively geographically close. Depending on the nature of their product, these companies usually have access to the Asian-Pacific corner of their market. Blockages exist which inhibit overseas firms wishing to export their product to Australia because different countries use different systems. While these are not necessarily major obstacles, they can discourage competition and give Australian companies a competitive advantage in Australia.

Additionally, some of the small companies in niche markets have developed strategic global alliances with larger, established international companies to give the illusion that they too are a large organisation:

> *These partnerships give the company size, which is important in the marketplace.* (small hardware and software development company)

Case study: Hi tech in a garden shed

Small hardware and software development company produces, among other things, hardware and software for the energy industry. The products are designed for use in upgrading power stations. This work is primarily carried out in a garden shed which also contains a simulator of an energy generation plant. They test software in the shed for use in old and new power stations worldwide.

Competition in this specific product market is minimal because the combination of technology used by this organisation is unique. No other company in Australia is working to develop systems in this area.

The main competition is from companies which offer full replacement of power systems. This decision lies in the hands of governments deciding whether to upgrade or replace a power generation facility.

For at least one respondent, the relatively high cost of telecommunications in Australia acted as an inhibitor to the further development of high level IT on the Central Coast. This affects the competitiveness of Australian firms, particularly those whose competition comes from the United States, because USA telecommunications costs can be much lower (e.g. bandwidth). This has forced IT companies on the Central Coast to become creative in the way they transmit and access data. One company on the Coast has established its own satellite links with the USA and transmits data in this way to avoid using telephone lines:

> *In this way it is cheaper to get data from the United States than it is to transmit it from Sydney to the Central Coast.* (small hardware and software development company)

Training

Employer approaches to training vary with the type and size of the organisation and the work undertaken. Smaller local companies tend to use contract labour to fill gaps in their own skills and will only train someone if they need to be taught a specific program. In all of the companies involved in this case study, contractors did not have access to the same training rights as employees. Contractors are simply used to fill gaps, and, although many may be

working full-time hours, their training is not considered to be a worthwhile investment for most employers.

Multinationals are more likely to have a commitment to training, including training budgets that staff can access. Training is used both as an incentive for staff as well as to fill gaps in the organisation's skills base. A USA-based company, for example, sponsors university students in order to develop their IT skills. The students work on site during their semester breaks. If the students are 'suitable', they will be offered full-time positions at the completion of their degree.

Small companies argue that they do not usually have the time to allow employees to attend training courses. They generally need the skills immediately. and cannot afford either to wait for someone to up-skill themselves or to pay large amounts of money to train someone who may then leave. Small companies in the region therefore tend to buy in skills through the use of contractors and will only train if time and resources permit.

Types of training required and used by information technology employers on the Central Coast

There are various levels of training available in IT. According to employers, TAFE provides basic training in IT and does not provide highly technical courses. University provides a background skill level, but one which is not always directly relevant to industry. Vendor training, both in Australia and overseas, provides current course content and is thus seen as being most useful to most higher level employers.

TAFE

It was reported that companies involved in medium level IT (PC support) prefer to employ people who have TAFE qualifications. People who have university qualifications generally don't want to work in PC support, which is not as lucrative or prestigious as other areas of IT. TAFE is used by this level of company to upgrade basic skills in networking and PC support skills.

University

High level IT companies on the Central Coast do not normally require applicants to be university qualified. Some companies will avoid employing a computer science graduate because they believe these students have been trained in outdated skills and expect more from their employer in terms of remuneration simply because they have a degree. Companies in the industrial side of IT, such as the *small hardware and software development company*, prefer to employ university graduates from disciplines other than computer science:

> *It is easier to teach people from other disciplines computer programming than it is to teach programmers other disciplines.* (small hardware and software development company)

University IT courses were criticised by employers as being outdated and irrelevant. Employers suggest that skills and experience are more important than tertiary qualifications. For some, the content of degrees do not change quickly enough to ensure industry relevance:

> *There is little relevance in a piece of paper when the core of a subject is not the same over time—unlike medicine or economics, IT changes too fast.*
>
> (small software development company)

Large companies require consultants to be MSCE or Novell Certified or hold the relevant vendor certification. They are interested in the skills and training job applicants have developed which are directly related to the software and systems they use. Larger companies will tend towards employing people with a tertiary qualification, not for the skills they

acquired doing the degree but because it demonstrates to the employer that the person has dedication and can apply themselves. In comparison:

> *smaller companies will see a sample of the work that you do, like it and don't care about your tertiary qualifications or industry certification.* (small software development company)

Vendor training

While most employers noted that vendor training was very expensive, it was also seen as the most suitable and relevant to the skills they required.

Companies on the Central Coast have an extra cost when employees attend training. There is no high level IT training provided on the Central Coast, and staff generally have to travel to Sydney to do courses. There is currently not enough demand on the Central Coast for high level training to justify courses being run. This demand may change in the near future though, with the Defence Force relocating some of its operations onto the Central Coast as well as WorkCover moving to Gosford and the general push to attract IT companies onto the Central Coast.

Self-taught enthusiasts

A lot of skills in IT are learnt by trial and error, particularly in new areas where no formal training is available. For example, internet and world wide web design areas are relatively new and have only really grown in the region in the last year. Besides general internet training, there is no training available for this type of higher level internet work. Generally, the people working in this area are self-taught enthusiasts.

Sometimes training is not available in specialised areas

In a lot of cases, IT training is not available because of the highly specialised nature of the product or because the product being designed is new to IT and therefore training courses have not yet been developed. Indeed, it was suggested that in some cases it would not be viable to develop training courses because the course would be obsolete before it was complete.

A company on the Central Coast specialising in hosting web sites and web design is in this situation. The skills required are not taught in any formal course. The company will not employ university graduates because they have not got the right skills and 'think that they can do anything', instead preferring to employ self-taught enthusiasts.

'There are no courses in this area. It is more time efficient to learn by trial and error on the internet. To teach yourself how to develop programs on the internet you need a basic programming background and then you have to become involved in your own project to see how systems work in a real situation.'

This company developed a web site where fast food retailers can advertise their product on the internet, customers can order through this site, and the product is then home delivered. The program already has the support of major fast food chains in Australia and New Zealand.

Outsourcing

Some IT companies on the Central Coast outsource parts of their production function. The high technology work is generally done in-house, and the lower level work is often

outsourced either to Australian companies or to low labour cost countries such as Indonesia and India. Some companies on the Central Coast do the design and outsource the production, just like 'outsourcing artwork to a printer for printing' (small software development company).

Use of contractors

There is a high use of contractors in IT generally, and more specifically on the Central Coast. Smaller companies will use contractors for two main reasons. First, they will buy in the skills they need for an immediate project. By using contract labour, companies do not have to bear the cost of training someone nor do they lose the time it would take for an employee to gain the necessary skills. Second, contractors are used because most of the work in high end IT is project-based. Employers require a small core of workers which they will employ as permanent and then will 'boost the ranks' when they win specific projects. Additionally, office space is used in the same way. Small companies will hire adequate office space for a project and then shrink back to being a home-office-based business when the project is complete.

As mentioned, many IT employers tend to buy in the skills required through contractors. However, skills shortages in Australia have forced a lot of small businesses on the Central Coast to use contract labour from overseas. Employers find these contractors through their own contacts; for example, they may have worked for a competitor or have used the product before.

Labour turnover

> *If you don't pay the right price, people will move—they can write their own pay check in IT if they are good.* (small hardware and software development company)

Some companies on the Central Coast pay 10-15 per cent less than the salaries paid to IT professionals in Sydney. The general expectation of employers is that living on the Coast compensates for lower pay. However, this approach also limits the type of people applying for work on the Central Coast. First, they are usually local and have been commuting to Sydney. They are typically experienced IT professionals with young families. Employers noted that more recent entrants to the IT industry are more willing to travel to chase the highest wage.

Some employers on the Central Coast focus quite strongly on lifestyle as a way to attract new employees, particularly those already residing on the Coast. Local government is also using lifestyle as a selling point to attract new business into the region.

Lifestyle on the Central Coast

A branch of a multinational company located to the Central Coast in 1998. The company relocated part of its Sydney office to the Coast because it could still offer staff all the 'challenges of Silicon Valley in a beautiful environment where housing costs were cheaper than Sydney'.

This organisation has quite low labour turnover and thus is not open to as many skills shortage problems as other companies because they develop their skills in-house. Management of the company believes that achieving low labour turnover relies on more than just offering employees more money. Giving people autonomy, access to training and lifestyle choices also helps retain staff.

Skills shortages

In some areas of IT (like PC support) there is an oversupply of skilled people. For these IT positions, employers reported no need for initiatives such as traineeships because there is already a high supply of skilled labour, particularly on the Central Coast. The shortages are in the more hi-tech, highly specialised work and these shortages are seen as global rather than regional.

When IT employers on the Central Coast advertise locally, they tend to get a high response rate. They prefer to hire locally because they believe that employees who live locally are likely to stay with the company for longer than if they are commuting from Sydney or Newcastle each day.

While labour shortages are extreme at the high end of IT, generally, labour shortages are not felt as strongly on the Central Coast as they are in larger capital cities such as Sydney because the Coast has a large pool of commuters to draw from. In highly specialised work though, even on the Central Coast, employers will often find it necessary to look overseas if they cannot find the relevant skills domestically.

High supply of medium level skills on the Central Coast

One company on the Central Coast which has branches throughout New South Wales requires medium level IT skills, generally for PC and network support functions.

When this organisation advertises a new position it gets an extraordinarily high number of applications. The branch of this organisation in Sydney cannot find someone for a similar position, even though it is offering higher remuneration than the Central Coast.

This is a good example of how even medium level PC and network support skills which are in oversupply on the Central Coast are in high demand in Sydney, and indicates that people who live on the Central Coast will accept lower pay and conditions than if they were commuting every day.

Solutions for skills shortages

Skills shortages are sometimes blamed on institutions (be they TAFE or universities) which are seen as out of step with market needs. Employers suggest that there are enough students participating in IT courses, but the shortages result because the skills being taught are irrelevant.

One suggestion for tertiary courses to become more relevant and the skills more useful to industry lies in the provision of sandwich courses for IT students. This is similar to the joint course run some years ago by TAFE and the Australian Computer Society. It could be done through TAFE or university and students would study for a block of time and then work for a period and apply the skills and theory they learn in industry. This would assist industry relevance.

Employers suggested that TAFE and university have the capacity to meet the needs of industry by providing flexible, relevant training. They typically blame the bureaucratic structures of these educational institutions, which they see as hindering them from changing courses in response to developments in industry.

Traineeships in information technology

There is still a strong sense of community on the Central Coast. Some employers, particularly at the lower end of IT, will employ trainees because they want to develop the skills of a young person on the Coast. However, a large proportion of employers indicated that they would use trainees because they are 'cheap labour'.

There are no trainees on the Central Coast at the higher end of IT. Companies at this end of the market will employ TAFE or university graduates as 'juniors' or 'trainees' until they gain the skills to contribute to the organisation. Their use of 'trainees' in this sense implies that they are employed at a lower wage. These are not formal trainee arrangements and have no formal commitment to training, although it is likely that a large amount of training, particularly on the job, is provided to the 'trainee'. Certainly at this end of the market there is little, if any, scope for the traditional 'trainee' model to apply.

Future of information technology on the Central Coast

Employers suggest that there is a need to develop the infrastructure side of IT before companies can be attracted onto the Coast. The high cost of telecommunications has to be managed, and there are already people working on various ways to transmit information more cheaply. Employers, supported by the Economic Development Board, are investigating how to establish a number of co-operatives including a data centre to reduce communication costs and another co-operative to tender for work, particularly larger contracts.

Employers also see a need to change the perception of the region as simply a holiday/retirement area 'because otherwise it will be hard to get high level IT business onto the Central Coast' (medium software development company).

Intermediaries

On the Central Coast there are a number of institutions which mediate the industry training market. These include GTCs, trade unions, employer associations and the NACs.

Skills mismatch

Training market intermediaries suggest that a key problem on the Central Coast with high level IT is skills mismatch. They suggest that as well as deriving from the type of courses that are offered, mismatch stems from the type of student attracted to IT study.

According to their assessments, until recently, most people working in the high end of IT came from engineering or science backgrounds. These people are generally very analytical and are, therefore, suited to IT. Intermediaries note that people in the high end of IT are now coming through with computer science qualifications. These people are not necessarily analytical and are not trained with emphasis on problem solving. At the high end of IT, intermediaries suggest that this has, in part, lead to the current skills mismatch. They note that there appear to be a shortage of 'highly analytical performers'.

Another problem at the high end involves a lack of information. Students don't know what they have to study to get into a certain area of the industry, and there is limited availability of this information, partly because of the changing nature of IT but also because of a lack of communication between the various parties in the industry training market. Additionally, while in IT there is a general awareness of which jobs are in high demand, it is hard for both job applicants and intermediaries to pinpoint where the jobs relating to these skills are because the demand for IT specialists is spread across so many industry sectors.

Training

In the past, the majority of external training was not directly relevant to companies working at the high end of IT. As a result, most companies on the Central Coast have developed in-house training systems.

These respondents reiterated that employers are not developing the skills of their employees because they do not employ them for long enough to make this training worthwhile. It has caused a vicious circle to develop in IT as the predominant form of employment changes from permanent full-time employment to contract work. Workers are increasingly expected to be responsible for keeping up to date and to finance their own skill development and maintenance.

The average length of a contract in IT is six months. Most contractors will attempt to build the price of their retraining into their overheads. They will work for eight months of the year on average and retrain themselves for approximately three months. They have to retrain constantly in order to get the next contract.

Training packages

There is competition among companies on the Central Coast in developing and supplying training packages. The Small Business Training Package developed by the Small Business Training Company was used extensively by employers in low end IT training. However, it was apparent that organisations were in the practice of buying the package because they had a trainee but not then delivering the training. The company has, since May 1998, checked with employers that they are actually delivering training to trainees. Nevertheless concerns with the quality and substance of the actual training delivered under these packages remains widespread.

IT training market intermediaries report that there is a high level of ignorance concerning the existence of the IT training packages, especially amongst higher level employers.

Competency-based training

At the lower end of IT training, CBT has made training 'more credible' because the course and outcomes are transparent to both employers and students. Portability of skills has improved with CBT because there is national recognition of the skills completed. Trainers can use it as a marketing tool because the training is nationally recognised.

Employers are slowly beginning to accept CBT, and there has been a shift from TAFE being seen as the only 'recognised' provider of training on the Central Coast to a recognition of the training courses that private providers offer. However, there are still some reported problems in recognition, with TAFE not always willing to recognise the skills learnt with private providers and accrediting these to the relevant TAFE course.

Intermediaries suggested that employers prefer a training system which allows for RPL because they can send their staff to get a certain qualification, and if the employee can demonstrate the required skills, they don't have to attend that part of the course.

Traineeships

Training intermediaries suggested that reform is required in the apprenticeship system. They suggested that traineeships in IT are a good idea because they can be shorter than current entry level training in IT, but they would need to be different and more flexible than current (yearlong) new apprenticeships. The intermediaries suggested that the capability of trainees who apply their skills in the workplace is much higher than those who do a course with little or no work experience or relevance.

There are only a small number of employers who are dedicated to developing skills on the Central Coast. Employers on the Central Coast, as elsewhere, are often attracted to use trainees because of the financial incentives. Some of the intermediaries maintained that quality control had improved. Under the auspices of the NACs, trainees are being monitored. RTOs go into the workplace a 'number of times each year' to check on the progress of the trainee and to ensure they are not just being used as a source of cheap labour but are actually receiving adequate training.

A small number of employers on the Coast will not employ trainees on completion because they feel that they have provided the trainee with enough skills to go into the workforce and will take on a new trainee. However, most employers in small business on the Central Coast will keep the trainee on at the end of the indenture if they are happy with their performance, particularly small business who cannot afford the cost of training a new trainee.

Traineeships at the high end of IT might pressure training providers to make formal training at this end of the market more industry relevant. Students would benefit from having applied the skills to actual situations.

The future of information technology on the Central Coast

It is expected that there will be an internationalisation of IT training, particularly at the high end. Virtual universities are already in operation, and a lot of international IT training firms are targetting their training at the Australian market. It is possible for them to capture part of the Australian training market because IT professionals will be prepared to use the internet and overseas training courses which are flexible and self-paced to update their skills. In IT, geographical boundaries do not necessarily act as a barrier to the provision of training.

Training in certain areas of IT will increase while the demand for low end IT training will probably decrease on the Central Coast. Two areas in which training intermediaries expect growth on the Central Coast are the demand for multimedia and e-commerce skills. At the higher end, there was recognition of the enhanced role that universities could play, offering more short term and after-hours postgraduate courses which people could use to upgrade their skills.

Key findings

- Employers on the Central Coast can be divided into low, medium and high IT employers. Low and medium IT workplaces on the Central Coast are not subject to global competition. High level companies experience globalisation in varying ways. However, most produce very specific IT products and services which can limit the amount of direct competition to which they are exposed.
- Most of the businesses on the Central Coast in high level IT are quite small and find it difficult to compete with large international organisations. However, they also have a number of advantages. First, the massive growth rates in the demand for IT invariably means that supply cannot keep pace with demand. Also, by aligning themselves with strategic partners, they are able to appear larger in the market. Second, the IT systems used in the Asia-Pacific region differ to those used in the USA and Europe, giving Australian firms a competitive advantage in regional markets.
- There are marked differences in the labour supply of (and demands for) people with low, medium and high IT skills on the Central Coast. Employers, training providers and intermediaries alike report that there is a large pool of available labour in the low and medium sectors of IT, while demand for high level skills far outweighs supply. The Central Coast has a large commuting workforce, some of whom would work locally if there was work available in their field. However, because of global shortages in certain

high level IT professional skills, businesses on the Central Coast still look overseas for people with the right mix of skills.

- Employers report that university and TAFE do not provide sufficiently relevant training in IT. Employers agree that it is possible for TAFE to adapt more readily than the universities to provide relevant training and short courses; however, the level of demand for this type of training on the Central Coast may not make this training viable. Employers on the Central Coast continue to prefer to use in-house and on-the-job training and vendor training.
- Small companies typically rely on contract labour to fill skill gaps in the organisation. They often claim that they cannot afford to train their own employees, nor can they afford the disruptions to staff availability because of project deadlines. Small companies tend to buy in skills through contractors and will only train if time and resources permit. Small companies tend to train reactively, while larger companies on the Central Coast take a more proactive approach to training.
- Training providers, employers and intermediaries alike agree that a traineeship in the high end of IT could be valuable in providing IT entrants with practical experience. However, employers regard trainees as TAFE or university graduates who have minimal work experience and who are paid a lower wage as a result. The success of such an initiative would require a 'culture shift' within IT.

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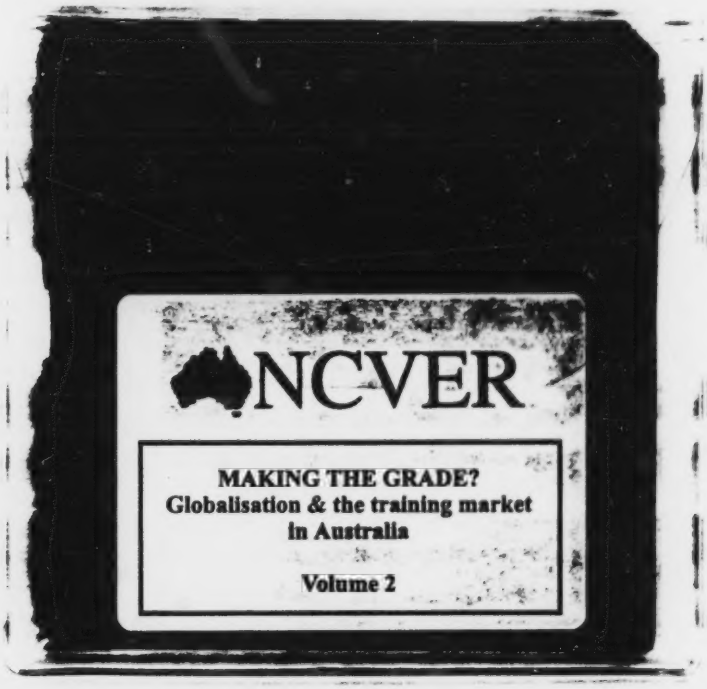

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Making the grade?

Globalisation and the training market in Australia

Volume 2

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Introduction

This volume has two purposes. First, it is intended to identify and clarify the key concepts to be investigated in the research. Second, it summarises the key empirical industry and employment data for the relevant industries and their labour markets at the aggregate level.

The core of the project is an investigation of the emerging industry training market in Australia. Policy development around the training market is arguably the major priority of VET in Australia. Despite its importance, there has been limited considered detailed analysis of how the market is actually working in the context of globalisation. The project is therefore necessarily concerned with the interaction of the nationally based and historically generated existing VET institutional arrangements with externally generated forces associated with 'globalisation'.

Posing the overall research aim in this way raises three immediate conceptual questions:

- What is a 'training market'?
- What is 'globalisation'?
- What are 'VET institutional arrangements'?

The answers to these questions are neither self-evident nor unambiguous. They have analytical, empirical and policy implications. For the purpose of this research project it is also important to clarify the concepts and areas of social and economic practice to inform subsequent research stages. With this in mind the paper has been structured as follows:

Technical note 1 discusses conceptual issues and debates associated with the terms, 'training markets' and 'VET institutional arrangements'. Globalisation was considered in the synthesis report.

Technical notes 2–4 summarise data describing recent changes to the overall structure of the Australian economy and the targeted metals and engineering, and information technology industries.

Technical Note 1

Debates Associated with the Terms 'Training Markets' and 'VET Institutional Arrangements'

Introduction

Vocational Education and Training (VET) involves between one and three billion dollars per year of public, private and individual expenditure, depending on how individual expenditure and opportunity costs are calculated. Access to and participation in education and training dramatically affects life chances and hence has major social equity implications of importance to public policy.

It has become commonplace within almost all areas of public policy to implicitly, or more usually explicitly, frame discussion within assumptions about the inevitable impact of 'globalisation' on domestic policy and to formulate policy responses as more or less inevitable results of the pressures associated with 'globalisation'. VET, with its necessary connection to the labour market through its role in developing skills and knowledge (the 'human capital' of a society), is no exception. The identification of 'human resources' as a critical 'factor of production' which can contribute to 'national competitive advantage' (e.g. Porter 1990; Reich 1992) underlines this linkage.

ANTA (1998b; p.i) in *Bridge to the Future: Australia's National Strategy for Vocational Education and Training 1998-2003*, states the relationship clearly in its Mission Statement:

> *To ensure that the skills of the Australian labour force are sufficient to support internationally competitive commerce and industry and to provide individuals with the opportunities to optimise their potential.*

The major forces for change identified by ANTA clearly indicate an appreciation of the inter-relationships and differential impacts of global, national and regional-level forces on both productivity and employment. The key forces identified include:

- the growth in global markets and intensified competition combined with lower Australian tariffs;
- the emergence of service and knowledge-based industries as significant for employment;
- changes in geographical and regional distribution of employment opportunities;
- the impact of new information/communication technologies on the community—and enterprises in particular;
- growth of small business and the increased use of 'non-standard' employment relationships such as casualisation, part-time, contract, labour-hire companies and the outsourcing of business functions;
- changes in work organisation involving 'flatter management', 'teamwork' and 'multi-skilling';
- demographic changes in the population;
- changes to social and family structures;
- the need to reduce the level of unemployment; and
- changes in the roles of government from direct service provision to the purchasing of services, with an increased focus on competitive processes and purchasing options. (ANTA, 1996; pp.1–2)

Although structural change is self-evident, there has been considerable debate over the causes and meaning of such changes. Many of the key concepts such as 'globalisation', the 'training

market' and the role of 'institutions' are not unambiguous. How these concepts are applied may affect how changes are interpreted and, hence, what choices are made to respond to them.

In the synthesis report we considered the background and contemporary literature surrounding the notion of globalisation. While this concept is perhaps the most important and contested, it is also necessary to consider the meaning and emergence of the idea of the training market and the concept and delineation of VET institutions.

The Emerging 'Training Market'

The emergence of the training market (NCVER 1997) represents a shift from a training system based on non-market principles of education administration. This shift has been promoted, in part, to help improve efficiency in the provision of skills in Australia. The need for such an improvement is intense owing to heightened international economic integration and competition—commonly referred to as *globalisation*.

Markets are a means to allocate scarce resources, and the model is usually that of a market for a tangible good on the basis of price. The market for *training* can be described as a set of institutional arrangements involved with the allocation of skills (especially credentialled skills) on the basis of price. These are *supplied* by training providers. They are *demanded* by workers and firms. In theory credentials/skills are allocated by price signals. Demand is determined by the returns available to those investing in training and supply by the relative cost of production.

Origins of the Contemporary 'Training Market' Model in the United Kingdom

Although the concept of skills and knowledge as a 'good' in which public and private investments could be made—and hence about which market-based decisions on the return to that investment could be rationally formed—is familiar in Human Capital Theory (Becker 1975), the concept and the promulgation of a 'training market' is a relatively new phenomenon. It first emerged as a major policy objective in VET in conjunction with the 'enterprise culture' promoted as a key element of the social and economic policies of the Thatcher period of the former conservative government in the UK (Evans 1992).

As numerous commentators have noted (Gospel 1993, 1994, Evans 1992; Green, 1995; Sheldrake and Vickerstaff 1987) training in the UK had historically been typically decentralised, 'voluntarist in nature' and chronically underdeveloped, particularly in comparison with continental systems. However, by the beginning of the 1980s the tripartite arrangements under the Manpower Services Commission and the Industry Training Boards had seen an increase in the quantity of training of around 15 per cent, at least for manufacturing (Sheldrake and Vickerstaff 1987; Green 1991). While the Manpower Services Commission (MSC) and Industry Training Boards (ITBs) period has been extensively criticised as having had little impact outside traditional trades 'it was as near a national system as the country had come to in its history' (Green 1991). From the late 1980s there was a dramatic shift of focus in training policy. Tripartite boards were abolished and employer-dominated Industry Training Organisations (ITOs) and local employer dominated Training and Enterprise Councils (TECs), based heavily on models derived from the Private Industry Council (PICs) in the United States, were established (see Evans 1992). This new system, while nominally based on a national qualifications framework, is essentially administered and monitored at local levels. The purpose of the accumulated changes from the mid-1980s from national system to local level arrangements was made quite clear in the *1988 Employment for the 1990s* White Paper. It was to 'give leadership of the training system to employers where it belongs' and, particularly in the context of entry level training, to give further encouragement

to young people to see themselves as consumers in a demand-led training market through a system of educational credits (see Friedman 1962) in order to:

> *put buying power into the hands of young people so that they can choose the training and training provider which best suits their needs (Employment Department 1992, cited in Green 1995, pp.100–102).*

The 1994 White Paper *Competitiveness: Helping Business to Win* also proposed extending the system to all VET sectors. These changes to VET should be seen as only part of a series of other changes designed to make the labour market more efficient, and included the deregulation of industrial relations and the control of youth wages through mandated Youth Training Scheme (YTS) allowances. One of the most commented on changes in the composition of VET participation over the proceeding decade has been the collapse of traditional 'apprenticeship' and other NVQ level 3 participation. Critics have described the associated policies as 'the triumph of ideology over experience' (Coffield 1992), although it should be noted that the 'market model' in the UK—and the use of 'training credits' is really a 'special market' and that the employer-led TECs are really only quasi-private—they are essentially private business-led mechanisms for distributing government funding. Although the details of the direction to be taken by the new government is not yet clear, it would appear that apart from additional targeted expenditure on literacy/numeracy and additional support for trainees, new Labour in the UK will not introduce a radical break with previous policies.

Implications of Market Models for Training Policy

As Moore (1992) in *The Private Government of Public Money* (building on Heclo & Wildavsky's (1981)) notes, there are three relatively distinct choices about the ways in which training policy may be organised. Each has implications for the role of the State in the regulation and governance of the system. The first is through a State-controlled bureaucracy, the second is a 'corporatist public-private mix' and the third through (relatively 'pure') 'market-based provision'. Moore rejects the first as inappropriate in a mixed economy, but notes that decisions about the second two organisational forms have significant implications for the role of the State.

Using standard liberal/pluralist political theory he argues that in the 'corporatist public-private mix' model (e.g. the continental 'social partnership model typical of Germany, tripartite arrangements in Australia and those which were emerging pre-Thatcher in the UK) the State is a partner and arbiter. In the (pure) market-based model the State has merely a regulatory role and training provision is a private responsibility conducted through company programs and market mechanisms such as recruitment (1992).

The Australian Context

In Australia, the promotion of 'market-based' approaches to VET provision was strongly signalled in the (1990) Deveson Report, although the issue had been previously flagged in the context of award and industry restructuring as a means to increase the national investment—both public and private—in Australia's training system. The 'Deveson approach' was endorsed by a Special Ministers' Conference in 1990 which, in setting out the framework of the National Training Reform Agenda, agreed in principle to:

- establish a national training market;
- implement a system of competency-based training;
- establish a national framework for accreditation; and
- establish a unified entry level training system.

These strategic objectives have remained essentially unchanged through successive governments, even though the specific details of particular policies and the responsibilities assigned to individual agencies have changed over time.

Marginson (1997:29) following Auerbach (1988) argues that there are difficulties delineating the boundaries of specific markets and notes that 'a market is not a "thing" but a behavioural relation and that 'market behaviour cannot be read off market structure'. In addition, he notes the difficulties in training markets where places in education (and VET) may be described as positional goods; that is, where they provide students with advantages in access to scarce education and training resources. Because positional goods are hierarchical in nature they confer places in a (status) hierarchy and some are more valuable than others. Although education and training institutions can 'increase production', the number of places in education and training that confer distinct *relative advantage* cannot be expanded. The advantages are realised in the rewards offered in the labour market and are finite. For example, by definition and in fact there are a limited number of 'top positions' in any hierarchical society. With a fixed number of places at each level of advantage one individual may gain advantage—but only at the expense of another. Institutions at the elite level—i.e. those with a high positional advantage—have an incentive *not* to expand student/trainee numbers because it decreases the scarcity and hence value of the credential. The higher the demand for the elite credential the less elite institutions are subject to market pressure. In fact, individually they may benefit by being able to charge higher prices for services/credentials; that is, under positional competition, market forces may redistribute *individual* advantage—often at the cost of increased individual investment in education/training reflected in credentials—without increasing the *aggregate* level of skills in the community. Marginson locates much of contemporary debate about 'credentialism' and 'quality' in education and training in this context and argues that in reality 'much of education is a mix of market and non-market production, with tensions between the two' (1997: 28).

Other commentators have also argued that the development in Australia of a 'national training market'—at least one based on pure competition—has not been unproblematic. Anderson (1997) notes that Deveson 'distinguished between the government-funded TAFE sector which operates largely on non-market principles and the "industry-funded training market" in which there is direct competition for resources and clients', and describes the developing training market in terms of 'a developing market for training outputs' (i.e. competencies) and a further developed "series of training inputs" (i.e. training staff, fee-for-service activities)' (1997; 17). Anderson further notes that the 'utility of this conceptual framework is limited in the absence of clear definitions of, and comprehensive data on, VET inputs and outputs' and that overall, 'the conceptual framework for analysing the size, structure and composition of the training market is generally underdeveloped'. As such information is essential to both effective policy formulation and market operation the work funded by ANTA on VET inputs and outputs and issues such as professional development may be seen as attempts to rectify this situation.

It is arguable that, in practical terms, the emerging training market in Australia may be considered to be a form of shorthand for 'marketisation' whereby market mechanisms and accountability systems based on defined outputs have been introduced to stimulate efficiency. The main processes may be summarised as a deliberate shift in emphasis from the 'supply' to 'demand' sides of a simplified market 'model'.

From 'Supply' to 'Demand'

While Marginson (1997), Anderson (1997), Burke (1992) amongst many have addressed theoretical issues associated with market theory as applied to education and training, the most important shift from a policy perspective has been the shift in the allocation of public resources from the 'supply' to the 'demand' side in VET, argued most consistently by Fitzgerald (1994).

In the report to ANTA, *Successful Reform* subtitled *competitive skills for Australians and Australian Enterprises*, Fitzgerald (1994) criticised the then existing approach to skill formation arguing that:

> the reforms have been constructed from a supply-side perspective and driven by a top-down policy approach. Efforts directed at demand-side issues appear centralist in approach...

and that a better way—and central recommendation—to achieve the objectives of training reform (that is, the 'development of a deep, diverse and dynamic labour pool') would be that:

> implementation of reforms should be refocussed on the demand-side. This is conceived as developing a training market around direct client relationships between training providers on the one hand and enterprises and individuals on the other, and in which skills held by individuals are publicly recognised and portable to the maximum extent possible.

Framework of the Training Market and Points of Regulation

As Lundberg (1994) and Ryan (1995) have argued, it is 'not just a policy objective' but 'a (structural) reality' that a competitive market exists in education and training with public providers such as TAFE, private providers, skill centres, schools, and Adult and Community Education all offering services and that, in practical terms, the important question is whether or not VET would become more or less efficient and effective—and the quantity and quality of training increase—if the existing 'market' became more competitive and education and training providers more 'market-responsive'.

The regulatory framework that has developed over the last decade and in which the emerging training market is expected to more efficiently and effectively operate can be summarised as having a number of key points. These are:

- A system of National Qualifications (the AQF) and recognised competency standards;
- A quality control system which regulates providers (Registered Training Providers/Registered Training Organisations);
- Competitive tendering arrangements for Commonwealth funding;
- User choice for contracts of training whereby funds follow students;
- An increased emphasis on structured Entry Level Training under New Apprenticeships; and
- The availability to public and private providers of standardised Training Packages for contracts of training, including assessment criteria.

Implications for the Project

At the macro level there is an integrated system which regulates standards, delivery, assessment and funding as they apply to formal VET. What is not known, however, is how these mechanisms operate at the micro level, and the effect the new arrangements may have on the choices made in the market.

VET Institutions

One of the most significant developments in VET in Australia over the past decade has been the development of a *national* system of standards, qualifications and advisory structures which provide an overarching framework—and a common quasi-legal regulatory environment—within which VET institutions now operate in all States and Territories. This is despite the constitutional provisions which, with limited exceptions involving training arrangements specified in federal awards under the industrial powers, defines education (and

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training) as a State responsibility. However, institutions, including VET institutions, develop over time and the development and form of VET institutions in Australia has been necessarily related to industry and occupational distributions and past investments in training infrastructure.

Although much of the occupational structure in Australia, such as professional, para-professional and craft-based occupations, was inherited from the UK, their relationship with education and training institutions has been different. Unlike VET in the UK, which has been extensively criticised as uncoordinated and 'voluntarist' until at least the 1960s, education and training institutions in Australia developed with strong State support from an early period.

Secular State-funded education was well established in colonial times and the 'sandstone' universities were progressively established from the mid-19th century. By the late-19th century, secular schools, universities, technical and agricultural colleges and schools of mines were well established, and by federation institutional support, in the form of associations for professions and unions supported by the emerging award and arbitration system for the craft-based trades provided both criteria for entry to, and a framework for, the production and reproduction of occupationally defined skills. Historians have long identified strong State involvement in the development of transport and other infrastructure in colonial Australia (e.g. Connell & Irving 1980), but the small size of most firms and their orientation to import substitution meant that traditionally the State has also been the major investor in education and training as *a substitute* for either the unwillingness or inability of the private sector to fund training.

By at least the end of WW1, for example, Sydney Technical College and the Museum of Technology were involved in research and development partnerships with local chemical, electrical and manufacturing industries and by WW2 the technical staff and the equipment of the major NSW technical colleges and the Victorian RMIT provided both a substantial production capacity and specialist tooling supplies to the war effort (Cobb 1984; Neill, 1991). Although mostly neglected by historians of education, who have concentrated on the school system, the involvement of the State-funded technical education sector in post-war reconstruction provided a framework on which later Commonwealth involvement following Kangan (1974) was able to be built.

The constitutional arrangements by which education is a State responsibility certainly affected the trajectories of technical education in the different States, particularly as technical education became technical and further education in the 1970s (Goozee 1992). For example, Victorian TAFE largely grew out of the technical school system, whereas in NSW the Technical Education Branch of the Department of Public Instruction was largely autonomous from the first decades of the century. By 1947–48 it had become a separate Department following extensive criticism of the inefficiencies, administrative duplication, lack of accountability and costs to the Treasury of the former decentralised college-based system (Cobb 1984)[1]. These different historical experiences explain, to some extent, the cultural differences retained within contemporary individual State TAFE systems, even though they share a common acronym.

Notwithstanding the differences amongst States and Territories—and periodic complaints from employer representatives—the post-Kangan developments supported by increased Commonwealth funding produced a system which was arguably amongst the most developed and accessible in any country, and superior to others in the English-speaking world (Goozee 1992). It is on the basis of this history, and the long-standing investments by both State and Commonwealth Governments, that the TAFE system remains the major provider of VET in Australia and deeply embedded in local communities as the 'provider of choice'.

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[1] From an historical perspective, it is somewhat ironic that the absorption in 1998 of technical education in NSW under, in practice, the school system has reversed almost a century of contrary industrial experience.

Of significance for this project is the fact that these long-standing investments in VET infrastructure by State and Commonwealth Governments provide major barriers to entry into the training market by other potential providers, particularly where significant capital investment may be required. For example, the cost of setting up a metals skills centre in competition with a TAFE engineering workshop is substantial, and probably impossible to recover without government or other subsidy given the static nature of employment in the industry[2]. Similar situations apply in other areas. Cost constraints and concerns that uncontrolled competition may increase the potential for the duplication of capital and human resources has lead to the development of the concept of 'thin markets' in NSW, QLD and WA and suggests State level reservations about the limitations of 'user choice' notwithstanding formal ministerial agreements.

Barriers to entry and constraints resulting from the existence of a strong publicly funded TAFE sector suggest that an understanding of 'VET institutions' on at least two levels is required. The first is the common one of a VET provider as an 'institution' and the second is the relationship of that institution to the 'institutional framework' which supports formal and informal skill formation processes.

While TAFE on the basis of diversity of courses, geographical dispersal and student enrolments is the largest 'VET institution', a broad understanding of VET means that the category of VET provider should also include schools, universities, adult and community education, as well as professional, industrial and trade associations and the range of private providers—such as business colleges—which have long been part of VET provision. For any market to function, a flow of information between providers and consumers is required. Information flow between employers and TAFE colleges and administrations has customarily been identified as a critical weak point. The shift to a demand-side emphasis in the development of the contemporary training market has attempted to rectify that weakness by giving employers and those seeking training more choice. The extent to which the emerging training market has succeeded in improving information flow is considered in the appendix to volume 1.

VET providers, as 'institutions', do not exist independently of a range of other institutional arrangements which support their continued existence. These include the government and industry bodies involved in training needs identification, administration and regulation but would also include industrial and social arrangements which support and reward skill formation in terms of monetary or other rewards. For example, the recognition of occupational classifications in industrial awards, the definition of the competencies to be achieved to achieve such classifications and the status attributed both within a workplace and in the wider community may affect decisions by individuals and groups alike to make particular choices about either participation in various forms of VET or between different providers. It is unlikely that all such choices will be simply based on price differences.

Implications for the project

In the regional-industry case studies that follow we indicate the range of training providers available and utilised in each of the regions. However, it is unlikely that the simple existence of a number of providers in itself will provide the basis of market choice. This is why it is also necessary to analyse the decision-making processes that appear to be at work at enterprise and individual levels. Such choices are likely to be constrained by the institutional framework within which they are made. As noted above, the operation of the emerging training market is intended to become increasingly dependent on 'demand side' signals. This requires consumer knowledge. The ability to make an *informed* choice will therefore depend to a great extent on the existence and operation of information channels at the individual, workplace,

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[2] Depending on the area and number of occupations covered it could be more than $1,000,000. For example, DEETYA is about to invest approximately $450,000–$500,000 in the CCI WA Skills Centre in Kwinana. On the basis of field research, this is still unlikely to provide a level of equipment equivalent to that of a TAFE college. (Source: Field notes; *Quality Arrangements in Group Training*, draft, ACIRRT, August, 1998)

organisational and regional level *in addition to those* which may operate at peak government and industry level. What is investigated is the way information flows (or fails to flow) between consumers and institutions and how this may facilitate or constrain informed choice in the market. This is likely to depend on the institutional frameworks within which different industries operate as well as the particular arrangements which may characterise the operations of any single VET institution.

Technical Note 2

Summary of Empirical Data Associated with Changes to the Structure of Australian Industry

Over the past decade Australia's economy has undergone fundamental changes. These changes have largely been driven by a need to make the Australian economy more internationally competitive through the deregulation of Australia's financial system, the privatisation of key government activities and the systematic reduction in tariff protection for the Australian manufacturing industry for instance. In response to, and in many cases a result of, the pressures of globalisation the structure of the Australian labour market has been altered substantially. Three of the most significant of these changes are:

- changes in the composition of Australian industry
- increased casualisation of work
- increase in self-employment and subcontracting

Changes in the Composition of Australian Industry

One of the most significant changes to the labour market has been the change in its composition which has seen a decline in the manufacturing industries and a growth in service sector employment as shown in table 1.

Table 1: Job Losses and Gains by Industry, Australia 1988 to 1998

Industry	Change in employment - number persons
Largest number of new jobs	
Property and business services	+ 391,400
Retail trade	+ 201,400
Health and community services	+ 199,400
Accommodation, cafes and restaurants	+ 144,600
Education	+ 120,900
Construction	+ 92,300
Personal and other services	+ 79,300
Cultural and recreational services	+ 61,800
Wholesale trade	+ 58,900
Largest number of lost jobs	
Manufacturing	— 70,000
Textile, clothing, footwear & leather	— 31,500
Machinery & equipment	— 41,400
Metal product	— 19,500
Electricity, gas and water	— 52,200
Rail transport	— 40,100
Insurance	— 20,600
Government administration and defence	— 17,400
Finance	— 16,200

Source: ABS Labour Force Surveys

Note: New job industries are all at highest level of the Australia and New Zealand Standard Industry Classification (ANZSIC) aggregation. Different levels of aggregation are used in the lost job industries for purposes of clarity.

Over the ten-year period to 1998 employment in metal manufacturing alone has fallen by almost 20,000 persons compared to property and business services which has seen

phenomenal growth, increasing by over 390,000. As discussed previously, defining the IT industry is both problematic and contentious; however, a large proportion of the industry is situated in the service sector and has contributed to an increase in service sector employment overall.

Increased Casualisation of Work

At the same time as the structure of the Australian labour market was undergoing radical change so, too, were the types of jobs on offer. Figure 1 details the employment growth in Australia over the period 1978–1998. It shows that while total employment has steadily increased over the period, a large proportion of this can be attributed to the increase in part-time employment. Part-time employment is generally associated with lower levels of training and opportunities for skill development and increasingly less job security where part-time work is by those employed as casuals.

Figure 1: Employment Growth in Australia 1978 to 1998

Source: ABS, Labour Force Surveys

Increase in Self-employment

The third major change in the labour market of relevance to this project is the increase in self-employed workers relative to wage and salary earners. This group is made up of sub-contractors, those operating their own businesses and workers employed by labour hire firms as contractors who often are employed at the expense of full-time workers. This trend has been observed in both the manufacturing and information technology industries. It has also been associated with an increase in outsourcing in both the private and public sectors. Unlike manufacturing, the information technology industry appears to have benefitted from this outsourcing. Sections of the industry have developed specialising in providing on-call service to firms rather than being directly employed by them.

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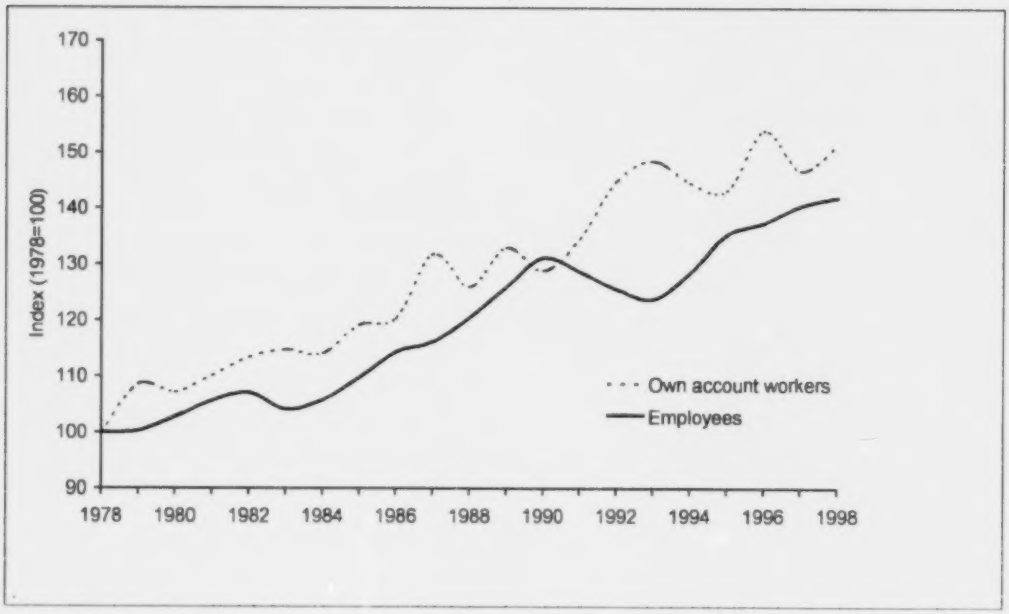
Figure 2: Growth in Self-employment and Wage and Salary Earners 1978-1993



Source: Derived from ABS, *The Labour Force Australia*, Cat no. 6204.0

Technical Note 3

The Australian Metals and Engineering Industry: Size, Structure and Trends

How big is the industry overall and what is the relative numerical significance of each of the elements which make it up? Table 2 summarises the most comprehensive information available on the subject.

Table 2 Employment in the Metals and Engineering Labour Market, Australia, August, 1996

	Metals and engineering labour market			
	Manufacturing		Non-Manufacturing	All Industries
	Metal Manufacturing	Non-Metal Manufacturing		
Number Employed	327,994	69,738	114,825	512,557
(% of metals and engineering workforce)	(64.0)	(13.6)	(22.4)	(100)

Source: Unpublished information from the 1996 Census of Population and Households.
Notes: Full details on how this is defined using ABS material and how these estimates were derived are the same as those outlined in Metal and Engineering Training Board, Vocational Training Plan, May 1994.

As the table reveals, in August of 1996 about half a million people were employed in the metal and engineering labour market. Of these workers the largest group (64.0%) is employed in metals manufacturing. The table also highlights that the metals industry extends beyond metal manufacturing and even into non-manufacturing activities. Indeed, 22.4 per cent of metal employees work in industries as diverse as mining, construction and wholesale—especially wholesalers of machine tools. Confirmation of this extensive spread of the industry is provided in Australian Bureau of Statistics (ABS) material concerning the coverage of the metal industry awards.[3]

The Metal Manufacturing Segment of the Industry: Structure and Recent Developments

While two and three workers in the metal industry are involved in metal manufacturing it is important to appreciate that a wide range of activities are undertaken in this segment of the industry. Sub-sectors predominantly involved in project or jobbing work like structural steel products have distinctive characteristics and experiences of change compared to workplaces

[3] Comprehensive details of the wide spread coverage of the Federal, Victorian, Queensland and Western Australian metal industry, engineering and/or trade awards is provided in David H Plowman and Malcom Rimmer, *Bargaining Structure, Award Respondency and Employer Associations*, UNSW Studies in Australian Industrial Relations, UNSW, 1992 pp.148-149, 163, 191-192, 195. It should be noted that some of the State awards are very expansive in coverage, extending to motor vehicle repair and allied services. This broader coverage under the State awards appears to reflect the customary links within a large family of jobs encompassing 'engineering' type tasks.

involved in producing more generic, bulk goods such as those involved in casting or steel tube production. Both in turn differ from producers of consumer durables and more specialised standard goods such as industrial machinery and planes, boats and trains. And each sub-component within metal manufacturing has experienced a different range of economic and structural changes over the 1980s and 1990s.

To help summarise its current structure and report on recent developments material on metal manufacturing has been broken down into four categories. These categories and the particular sub-segments that make them up are summarised in table 3.

Table 3: Different Components of Metal Manufacturing

Element of Metal Manufacturing	Corresponding ABS Category & % of its value-added falling within metal and engineering	Key specialised industries making up this category (& industries included in the ABS category that should be excluded)
Machinery, Electrical and Electronic Equipment and Appliances	Other machinery and equipment (100%)	Photographic, professional and scientific equipment Appliances and electrical equipment (e.g. radios, TVs, refrigerators) Industrial machinery and equipment (e.g. agricultural machinery, machine tools, pumps and compressors)
Transport Equipment	Transport Equipment (55.7%)	Motor vehicle components Ships and Boats Railway rolling stock Aircraft Note: this category should exclude Motor Vehicle Assembly
Fabricated Metal Products	Fabricated Metal Products (100%)	Fabricated steel products (e.g. coal loaders) Architectural metal products Metal containers and furniture Cutlery, springs, nuts and bolts
Casting, Forging, Steel Pipes and Tubes	Basic Metal Products (15%)	Iron and Steel Casting and Forging, Production of steel pipes and tubes. Note: this category should exclude Iron and Steel Products, Basic Non-ferrous metals and non-ferrous metal basic products.

Wherever possible data will be presented in a way that is consistent with these definitions. Sometimes the statistical material is not released in a form that allows for the removal of non-metal and engineering parts of metal manufacturing. Where this occurs it will be noted and taken into account when interpreting the data. The data also reports on the period from the early 1980s to the early 1990s. Ideally the following analysis should be based on more up-to-date information. Unfortunately, conventions in data collection have limited the capacity to do this. Where more information is available it is mentioned in the text. All tables report over a common period to allow for direct comparability across the variables examined.

Key Developments: 1981–82—1991–92

It is well known that the metals and engineering sector faces significant and growing competition from overseas manufacturers. Indicators of the significance of the industry's involvement in international trade are summarised in Table 4.

Table 4: Indicators of International Competitive Pressures in Select Metal Manufacturing Industries, Australia: 1981–82 and 1991–92

Industry	Indicator	1981–82	1991–92
Machinery, Electrical, Electronic Equipment and Appliances	% of domestic market	49.4	34.8
	% of output exported	8.5	12.5
	Effective rate of assistance	21	15
Transport Equipment	% of domestic market	60.0	55.2
	% of output exported	4.9	12.2
	Effective rate of assistance	71	31
Fabricated metal products	% of domestic market	88.1	85.0
	% of output exported	2.8	7.7
	Effective rate of assistance	31	16
Basic iron and steel	% of domestic market	88.2	88.5
	% of output exported	8.2	14.0
	Effective rate of assistance	15	17
Manufacturing	% of domestic market	74.2	69.0
	% of output exported	13.3	21.4
	Effective rate of assistance	25	17
Other Factors . Trade Weighted index . US$/A$. JapaneseY/A$		(80)	(50)

Source: Industry Commission, *Australian Manufacturing Industry and International Trade Data 1968-69 to 1992-93*, Industry Commission, Canberra, 1995

One of the most striking features of this table is the profound variation in levels of import penetration in the Australian market for the different sub-sectors at the beginning of the 1990s. At one extreme is the Machinery, Electrical and Electronic Industries segment where local suppliers account for just over a third of domestic sales (34.8%), down from just under half (49.4%) in the early 1980s. At the other extreme are the basic Iron and Steel producers whose share of the domestic market has remained stable at over 88 per cent.[4] The experiences of Transport Equipment and Fabricated Metal Products in maintaining domestic market share fell between these extreme cases.[5]

Table 4 also reveals significant increases in exports for all elements of metal manufacturing. This development has been broadly in line with that occurring across manufacturing more generally. The table also reveals that effective rates of assistance remained stable or fell in the ten years to 1991–92. Against this it should be noted that the real value of the Australian dollar also fell. This latter development probably reduced the impact of reduction in assistance during this period.

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[4] The situation for casting, forging, steel pipe and tube production was hard to identify precisely from available data. What data was available indicated it was basically the same as that for the larger basic iron and steel industry grouping, hence the use of the more aggregated category is appropriate in this case.

[5] Also note the importance of differences at the three and four-digit level. Computer imports knocked around part of general machinery and consumer appliance at the same time as other parts of this ASIC code did well in terms of market share and exports. Hence while overall trend was decline this was not uniform across all the elements making up this group of industries.

The net result of these changes appears to have been a decline in domestic market share for sectors producing more elaborately transformed goods, with fabricators and those involved in casting and forging holding their own. All have increased the extent of their exporting activities. This, however, has occurred from a very low base. Table 5 summarises movements in output levels of these industries.

Table 5: Changes in Output Levels, Select Metal Manufacturing Industries, Australia, 1982–83 and 1991–92 (Reference base year 1989-90 =100)

Industry	1982–83	1991–92
Machinery, Electrical and Electronic Equipment and Appliances	82.0	99.0
Transport Equipment (includes cars)	82.7	84.5
Fabricated metal products	81.6	85.6
Basic metal products	74.4	103.9
Manufacturing	84.2	96.4

Source: ABS, *Yearbook Australia 1995*. Categories reported at the two-digit Australian Standard Industry Classification level

What is particularly interesting is that while levels of international competition have obviously increased, sometimes resulting in the lost of domestic market share, this has not resulted in reduced levels of production. Instead output, instead, appears to be have been more sensitive to fluctuations in the domestic business cycle. Consequently, it seems that in terms of output international competition has restrained possible growth rather than reduced levels of production as such. It is particularly interesting to note that even during the recession some parts of metals manufacturing continued to grow or suffered only minor setbacks in the levels of production. This was especially the case in Machinery, Electrical and Electronic Equipment and Appliance Manufacturing and Basic Metal Products, both of which grew dramatically over the decade to 1991–92: the former by over 20 per cent, the latter by just under 40 per cent. These sub-industries were amongst the strongest performing sectors of Australian manufacturing during this period.

Unlike output of levels, there were dramatic falls in employment levels in the ten years to 1991–92. These developments are summarised in table 6.

In absolute terms the greatest falls were in two sub-industries: Machinery, Electrical and Electronic Equipment and Appliances (down 49,000); and Transport Equipment (down 40,000). Even in relative terms the decline in transport equipment was significant at 41.7 percent. A fall of similar proportions afflicted those involved in Casting, Forging, Steel Tube and Pipe Production. Given that output remained relatively stable during this period most of these falls must have resulted from significant increases in productivity. The inability to extend output to meet growing domestic demand and export opportunities also appears to have contributed to this outcome. While there have been modest employment gains in some parts of Metal Manufacturing in the first half of the 1990s, these have been marginal compared to the losses in the 1980s. Moreover, they have occurred against a background of rising output growth implying further labour productivity growth. Further details on more recent developments in the machinery, electrical and electronic industries are provided in table 7.

Table 6: Changes in Employment Levels, Select Metal Manufacturing Industries, Australia, 1981–82 and 1991–92 ('000)

Industry	1981–82	1991–92	Difference (% change)
Machinery, Electrical and Electronic Equipment and Appliances	163	114	49 (30.1%)
Transport Equipment	96	56	40 (41.7%)
Fabricated Metal Products	113	86	27 (23.9%)
Casting, Forging, Steel Pipe and Tubes	17	10	7 (41.2%)
Manufacturing	1155	907	248 (21.5%)

Source: Industry Commission, *Australian Manufacturing Industry and International Trade Data 1968-69 to 1992-93*, Industry Commission, Canberra, 1995

Table 7: Employment Levels in the Machinery, Electrical and Electronic Industries, Australia 1981–82, 1986–87, 1991–92 and 1995–96

	1981–82	1986–87	1991–92	1995–96
Photographic & Scientific Equipment	9,536	9,700	11,007	11,199
Electronic Equipment	20,970	19,900	18,509	19,833
Electrical Equipment and Appliances	58,404	46,100	38,761	37,323
Industrial Machinery and Equipment	74,020	52,500	45,884	51,826
Total MEE Industries	162,930	128,200	114,161	120,181
Total Manufacturing	**1,154,659**	**1,024,700**	**906,938**	**907,694**

Source: Industry Commission, *Australian Manufacturing Industry and International Trade Data 1968-69 to 1992-93* and ABS, *Manufacturing Industry Australia, 1995-96*, Cat no 8221.0

As is evident in this table the big shakeout in the Machinery, Electrical and Electronic (MEE) industries occurred in the early 1980s, with smaller employment losses associated with the most recent recession of the early 1990s. White goods and industrial machinery and equipment appear to be particularly cyclically sensitive. In the first half of this decade employment levels have stabilised and, if anything, increased slightly.

Given these developments in output and employment it is not surprising that labour's share of turnover and value-added declined over this period. These developments are summarised in table 8.

Table 8: Wages Share Ratios, Select Metal Industries, Australia, 1981–82, 1989–90 and 1995–96

Industry	Wages to Turnover ratio (%)			Wages to value-added ratio (%)	
	1981–82	1991–92	1995–96	1981–82	1989–90
Machinery, Electrical and Electronic Equipment and Appliances	25.7	21.6	19.1	58.0	47.7
Transport Equipment (includes cars?)	*	26.0	23.0	*	48.6
Fabricated Metal Products	23.9	20.8	21.0	56.7	48.1
Casting, Forging, Steel Pipe and Tubes	*	*	17.8	*	47.5
Manufacturing	20.8	16.9	15.0	54.2	40.0

Source: Industry Commission Data
Note:* signifies data either unavailable or unreliable

The first three columns report on wages share as a proportion of turnover. As is well known labour costs are only a relatively limited proportion of total costs in the manufacturing process.[6] Generally speaking for metal manufacturing they declined from about a quarter to a fifth of input costs in the decade to 1991–92. This shift was of a similar order to that occurring elsewhere in Australian manufacturing at the same time.

Of greater interest, however, is labour share of value-added. While wages may be a relatively small proportion of input costs, they are a major claim on industry value-added. Developments here are summarised in the last two columns. It is particularly interesting to note that this too declined between 1981–82 and 1989–90—the latest year for which data are available.[7] It is almost uncanny how the level of labour share of value-added is almost identical for the four sub-components of metal manufacturing. The uniformity of the decline also indicates that there was a major shift in factor shares at the sub-sector/industry level. The policies surrounding this development receive close attention in the following chapters. The uniformity of factor shares also highlights the importance of separating out the non-metal and engineering components of metal manufacturing. If the more capital-intensive sub-sectors are not netted out this level of uniformity disappears. It seems that many metal and engineering employers face a relatively uniform factor share situation.

In recent times a major structural change at work-site level appears to have been a decline in the average size of establishments in these sectors. Care should be exercised when interpreting this data given the cautions issued by the ABS. Nonetheless, it appears that at the beginning of the 1980s around two-thirds (65.6%) of employees in metal manufacturing were employed in establishments with 100 or more workers. By the beginning of the 1990s this had fallen to a little over half (55.7%).

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6 Skinner, W. (1986)'The Productivity Paradoxy', *Havard Business Review*, 1987 vol.64, no. 4, pp.55-59.

7 Data on 'industry gross product' is available for 1995–95. But this is not directly comparable with value-added as defined in earlier years. Hence the analysis must be confined to shifts in factor shares from the early 1980s to the early 1990s.

This development was particularly pronounced in those sub-industries already having the largest proportion of workers employed in smaller establishments. In the Machinery, Electrical and Electronic Sector the proportion fell from 56.8 per cent to 47.9 per cent. The shift was even more dramatic amongst metal fabricators where the proportion fell from a low base of 38.0 per cent to 26.1 per cent.

The distribution of employees by workplace size was also mirrored by business size measured in employment terms. In Machinery, Electrical and Electronic sector and Metal Fabrication less than ten per cent of the workforce was employed by the four largest firms. In Transport Equipment and Basic Metal Products the proportions were 25 and 45 per cent respectively.[8] Further details are provided in table 9.

While reasonably comprehensive information is available on the key structural variables considered above, only patchy data are collected on economic performance. That which is readily available is summarised in table 10.

These data concern developments in the late 1980s and early 1990s: a period of movement from boom to recession. This shift is clearly evident in the figures. Investment levels during this period fluctuated dramatically. For example, as the 1980s boom neared its peak in 1988–89 investment in general machinery, electrical and electronics equipment and appliance and metal fabrication totalled $1,089m. By 1991–92 this had nearly halved to $667m. This was despite the fact that profits in both years were generally constant at over $1,000m in each year. Trends in transport equipment and basic metals are obviously overwhelmed by material from car assembly, steel and non-ferrous metal producers. The scale of the impact of recession on profits in Transport Equipment was clearly considerable. Profit fell tenfold when the result of 1991–92 is compared with the result for 1988–89—down from $413m to $53m.

Details concerning return on assets and operating profit margins for the years 1990–91 and 1991–92 are summarised in the last four columns. Between these two years there was a general deterioration in performance on both indicators, with transport equipment particularly severely hit (for example, negative returns in 1991–92). The changes were more dramatic for the industries including more capital-intensive production; that is, transport equipment and basic steel production. Amongst fabricators and machinery, electrical and electronic equipment and appliance manufacturing levels and movements were pretty close to manufacturing averages. Operating profit margins in 1991–92 were between five and six per cent and return on assets between 7.5 and 8.5 for these latter two groups.

Table 9: Distribution of Workplaces and Business Units in Metal Manufacturing, 1991–92

	Machinery (bar Transport Equipment) and Consumer Appliances	Transport Equipment	Fabricated Metal Products	Basic Metal Products
Concentration of enterprises in employment terms				
. % of employees in largest 4	9	25	7	45
. % of employees in all bar 16 largest enterprises	78	46	80	27

Sources: *ABS Manufacturing Industry, Australia* Cat no. 8221.0, 199192 as cited in NMEIB Plan April 1994, ABS Year book, 1995

[8] Concentration statistics taken from ABS *Yearbook Australia* 1995

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Table 10: Indicators of Economic Performance, Metal Manufacturing Industries, Australia, late 1980s–early 1990s

	Capital Expenditure ($'000)		Profits ($'000)		Return on Assets (%)		Operating Profit Margin (%)	
	88–89	91–92	88–89	91–92	90–91	91–92	90–91	91–92
Machinery (bar Transport Equipment) and Consumer Appliances	1,089	667	1,248	1,016	10.6	7.8	7.9	5.9
Fabricated Metal Products					8.0	8.2	5.2	5.1
Transport Equipment (includes car assembly)	822	554	413	58	3.2	-6.0	1.9	-3.8
Basic Metals (includes steel, nonferrous etc.)	881	1643	1,905	140	9.1	5.1	10.3	5.9
Manufacturing	7,666	6858	8,616	5,788	7.7	5.9	6.4	5.2
All Industries					**11.2**	**8.4**	**8.7**	**7.3**

Source: ABS *Yearbooks* and unpublished data from the ABS Survey of Business and Economic Performance

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Summary

Overall the Metals and Engineering industry employs over half a million people across a range of manufacturing and non-manufacturing industries. The single largest segment of the industry, metal manufacturing, has experienced dramatic structural changes over the 1980s and into the 1990s. Levels of international competition have increased, eroding domestic market share for producers of elaborately transformed goods, but having a lesser impact on fabrication and casting/forging workshops. While exports are up, this is from a low base and has not made up for the loss of domestic market share. Despite these developments, overall output levels have not declined, remaining stable around a cycle that is closely linked to domestic economic booms and recessions. Employment levels have, however, fallen dramatically. Although there have been some modest employment gains in the last few years, these have done nothing to offset the falls of between 30 and 40 per cent in key metal-manufacturing industries in the decade to 1991–92.

The maintenance of output levels in the face of declining employment implies significant productivity improvement. The benefits of this appear to have been passed on to consumers in the form of lower prices and to employers/owners in the form of larger profit share of value-added. Not surprisingly labour shares of turnover and value-added have declined over the same period. In parallel with these developments workplace size has fallen, with the declines greatest in those industries with the smallest proportion of workers in factories with 100+ workers—metal fabricators and in the machinery, electrical and electronic industries.

The limited indicators of economic performance reveal highly volatile investment patterns and profit. Levels of volatility are greatest for capital intensive sectors. The heartland of metals and engineering, fabrication and machinery, electrical and electronic manufacturing have performed pretty close to the manufacturing average with less volatile swings.

Technical Note 4

Overview of the Australian Information Technology Industry

The Australian Information Technology Industry: Size, Structure and Trends

The information technology (IT) industry has become one of the fastest growing industries in the developed countries. The industry is characterised by rapid technological change, short product life cycles and a market where prices for both products and services are constantly falling. This technology-driven product market makes it difficult to capture productivity gains. The structure of the industry is also constantly changing as the convergence between communications and the media progresses and business use of IT increases (Houghton et al.1996: XI). It is an important industry not only because of its size and growth rate but also (and perhaps more importantly) because of its potential to enhance the productivity and competitiveness of other businesses in the economy as providers of the national information infrastructure (Information Industries Taskforce 1997). The industry is also of significance because of its capacity to increase Australia's level of economic performance. The Information Industries Taskforce argues that:

> *it is through their enabling role that the information industries can contribute most significantly to Australia's future economic growth, employment and productivity (1997: 14).*

How is the Information Technology Industry Defined?

One of the most problematic features of the IT industry is that it defies standard classification systems such as the Australia and New Zealand Standard Industry Classification (ANZSIC). This is owing to its diverse nature and structure, covering a range of industries extending from manufacturing through to service industries. To date there is no internationally recognised standard on which goods and services should be included in a definition of IT. This is owing in part to the industry's growth which has been faster than the evolution of classification systems. As a result there is no single ANZSIC category for the IT industry.

A range of approaches has been developed to address this problem and to allow for definitions of the industry to be constructed. The most popular approaches used in Australia define the industry on an activity basis, i.e. the IT industry is made up of those businesses which earn a large part of the income from a particular set of IT&T goods and services (ABS 1995).

The ABS in its publications and surveys adopts a narrow definition of IT, i.e. businesses which create goods and services based around computer chip technology (ABS 1995). In the 1995-96 survey the following industries (ANZSIC classes) were included in the IT industry:

- (2841), computer business and machine manufacturing
- (2842) telecommunication, broadcasting and transceiving equipment
- (2849) electronic equipment manufacturing, n.e.c
- (2852) electric cable and wire manufacturing
- (4613) computer wholesaling
- (4614) business machine wholesaling, n.e.c.
- (4615) electrical and electronic equipment wholesaling n.e.c.
- (7120) telecommunication services
- (7831) data processing services
- (7832) information storage and retrieval services

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- (7833) computer maintenance services
- (7834) computer consultancy services

This is based on a definition agreed to by policy and industry organisations where the IT industry covers computers and communication equipment and the services which facilitate the use of this equipment. Where industries manufacture or service microprocessors for the setting or control of functions they have been excluded from this definition (ABS 1997c).

In order to over overcome these difficulties Houghton et al. (1996) propose a new IT map where the industry is divided into four main industries—communication services, information services, equipment manufacturing and information products (see table 11). This map is an attempt at establishing a new conceptual framework for analysing the industries which make up IT. The IT map allows for the integration of existing classification schemes (e.g. ANZSIC) and data sources to explore the dimensions of the IT industry.

Table 11 summarises the IT map and allocates the appropriate ANZSIC industries. The table shows that IT cuts across a range of ANZSIC classifications from the business services to manufacturing industry sectors. This map also allows some bridge between the occupational and industry dimension of a definition of the IT industry by suggesting the types of occupations you would expect to find in the IT industry (Baxter 1998).

Table 11: Map of the Information Technology Industry

Communication Services	**Information Services**
(7120) Telecommunication Services	(7832) Information Storage and Retrieval Services
	(7834) Computer Consultancy Services
	(7831) Data Processing Services
	(7833) Computer Maintenance Services
Information and Communication Equipment	**Information Products**
(2852) Electrical Cable and Wire Manufacturing	(2430) Recorded Media Manufacturing and Publishing
(2842) Telecommunication broadcasting and Transceiving Equipment Manufacturing	
(2841) Computer and Business Machine Manufacturing	
(4613) Computer Wholesaling	
(7743) Plant Hiring and Leasing	
(2849) Electronic Equipment Manufacturing	
(4615) Electrical and Electronic Equipment Wholesaling	

Source: Houghton et al. 1996, p.103.

A definition of the industry is further complicated by the fact that it is also possible to view the industry as a hybrid of both industry and occupational classifications as IT personnel tend to work in all industry groups, and, as such, a definition of the IT industry may need to be sufficiently broad to acknowledge this. Table 12 shows the distribution of IT personnel across industry groups. It suggests

that while there are clusters of IT workers in Manufacturing and Property and Business Services (16.4% and 32.7% of all IT staff respectively) IT occupations are present in every industry. A definition which focusses exclusively on industries which derive a large proportion of their business from the manufacture or service of IT goods and services can not capture the true breadth of the industry.

Table 12: Distribution of IT&T Staff by Industry

Industry	Proportion of All IT&T Staff
Mining	1.3%
Manufacturing	16.4%
Electricity, Gas and Water Supply	1.4%
Construction	3.9%
Wholesale Trade	11.7%
Retail trade	3.8%
Accommodation, Cafes and Restaurants	0.23%
Transport and Storage	4.5%
Communication Services	2.7%
Finance and Insurance	14.6%
Property and Business Services	32.7%
Education, Health and Community Services	3.0%
Cultural and Recreational Services	1.7%
Personal and Other Services	2.0%
All Industries	**100.0%**

ABS (1997a) *Business Use of Technology, 1993-94*, Cat. no. 8129.0.

As the definitional issues remain unresolved, both within the literature and at the practitioner level, estimates on the value, size and employment in the industry vary widely. As a consequence the IT industry tends to be referred to in two ways, the more specific information technology and telecommunications industry (IT&T) and the broader information services industry which incorporates the range of IT activities performed across all industry groups.

The Structure of the IT&T Market

The structure of the IT industry both locally and overseas has been shaped by both globalisation and a desire of firms to locate in close proximity to major markets. This has produced both a concentration of IT production and service providers geographically and the emergence of a relatively small number of firms which dominate world trade.

As a direct result of globalisation the IT&T industry, specifically the design, engineering and production of electronics and IT&T products, is seeing world production, R&D and trade in these products dominated by less than 50 transnational corporations, with much of this trade being intra-firm (Kuras 1998:2).

There has also been a shift in production to low cost global production centres in South-East Asia and more recently in Ireland and Israel where levels of education are high, governments offer tax incentives and wages are relatively low. These areas have then benefitted from spillovers in the high value design, engineering and manufacturing associated with the production of IT goods and services. The global trend to outsourcing of IT services and the emergence of world specialist centres is

facilitated by the availability of high quality international telecommunication links at ever reducing prices (Kuras 1998: 2).

Manufacturing in the information industries within Australia is also highly geographically concentrated, with 77 per cent of all IT manufacturing located in NSW and Victoria and the majority of these within the Sydney and Melbourne metropolitan areas. This reflects manufacturers' attempts to capture economies of scale, proximity to major suppliers and customers and ready access to skilled labour (Kuras 1998: 5). This geographical concentration is expected to continue, with other States likely to contain local companies and service operations such as data centres and call centres. It is also likely that clusters of centres of excellence could develop in these States around local activities such as defence and mining exploration (Kuras 1998: 6).

The local industry consists of two key user sectors—businesses (major users) and households. In the business sector the take-up of new technology is high with 49 per cent of all non-agricultural businesses having computers and 99 per cent of all businesses with more than 100 employees having computers (ABS 1997c). Of these 60 per cent of computer systems in Australian businesses are less than 5 years old and 15 are less than 1 year old (AIIA 1998). The business sector provides an ever-growing market for new technology and upgrades of hardware, software and IT infrastructure. In 1993-1994 businesses spent $22.3 billion on IT and telecommunications or 2.9 per cent of total business expenses (ABS 1997c).

The Internet has provided a key source of market growth for the IT industry with Australia's commercial market on the Internet growing at 11 per cent per month with experts predicting that by 1998 Internet traffic will surpass voice traffic (AIIA 1998: 10).

In the household sector of the market it is estimated that around 2.5 million Australians have a PC at home. The growth area in this market is again in Internet access for recreation, entertainment and work. It is estimated that Internet access increased 14 per cent between February and May 1998 and that currently around 34 per cent of all households with a computer have Internet access (AIIA 1998: 3).

It has been argued that Australia is well placed to develop a strong IT&T industry for a range of reasons which include:

- the highly educated and skilled workforce
- range of language skills held by the workforce
- Australia shares a time zone with large fast growing markets in Asia
- stable government and well-established protections for intellectual property
- established infrastructure services
- cost of employing professionals in Australia is lower than in other developed countries (Kuras 1998:7).

Kuras argues that these strengths can be exploited by entering the global market. They may, however, be hampered by the limited export focus of almost all Australian-based IT&T businesses and the fact that Australia has not yet established a global reputation in IT&T because of a small domestic market which has limited local firms establishing their brands in the global market. A strategic export focus for Australian producers is also limited by the cost and availability of capital and the relatively high cost of low-skilled labour in Australia (Kuras 1998: 8).

Table 13 shows that the businesses operating in the information industry are predominantly small, with 95 per cent employing less than 20 employees. The industry is also dominated by small businesses in the information services sector, which account for 88 per cent of all businesses in the industry.

Table 13: Number of Businesses by Information Industry Sector and Employment Size

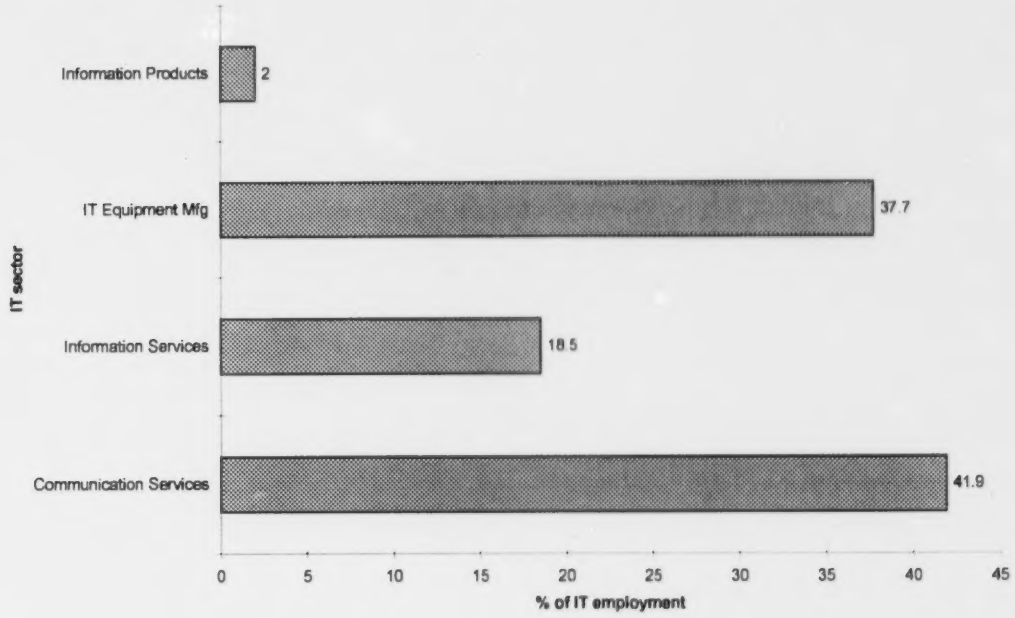
Sector	Small	Medium	Large
	< 20	*20-99*	*>100*
Communication Services	174	12	3
Information Services	4,725	132	29
Information and Communication Equipment	211	52	23
Information Products/content*	30	5	1
Total	**5,140**	**201**	**56**

* excludes wholesale and retail activities
Source: Charles et al. (1997) Chapter 2.

Employment in the IT Industry

Estimates of employment in the IT industry vary because of definitional issues discussed earlier, in particular whether employment should be measured by the number of people working in specific IT industries or whether the industry employment should reflect the number of IT professionals who work across a range of industries; that is, those employed in information industry. Using the ABS definition there are around 250,000 employed directly in the IT industry in 1995-96; however, IT&T professionals, programmers, systems analysts, operators and the range of IT management which support business and government account for an additional 250,000 persons, giving a total information industry employment of around half a million employees or ten per cent of the labour force (AIIA 1998a: 3). The number employed in this industry is then comparable to those employed in the tourism, accommodation and restaurant trade, one of the largest and fastest growing industries in Australia (Information Industries Taskforce 1997)

Figure 3: Employment in Australian IT Industries, 1992-3



Source: Houghton et al 1996, p.103

Employment Growth in IT

Table 14 illustrates the difficulties associated with defining the IT industry and those who work in it. It suggests that 121,000 workers were employed in IT occupations in the IT industries in 1994-95 compared to 319,100 employees in IT occupations across all industries. IT occupational growth was greater across IT industries than all industries where IT occupations are employed over the period 1989-90 to 1994-95 (10% compared to 3%). The growth in computing professionals and data processing machine operator occupations was also higher in IT industries than across all industries. Houghton et al. suggest that this could be a result of the trend towards outsourcing IT activities or vertical disintegration as a mode of entry into the computer services industry.

Over the period 1992-93 to 1995-96 the ABS estimates that employment in the industry has grown by 49 per cent from 136,000 to 208,000, with the number of businesses almost doubling from 7,199 to 13,535 (ABS 1997c). Of those employed in 1996 in the IT industry, 93 per cent of jobs were full-time and two-thirds were male (ABS 1997c).

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Table 14: Employment and Compound Annual Growth Rates (CAGR) in IT Occupations, 1989-90 to 1994-95

ASCO	Occupation	Selected IT Industries			Total all industries		
		89-90	*94-95*	*CAGR*	*89-90*	*94-95*	*CAGR*
1311	Data processing managers	1,750	2,500	7	7,700	8,400	2
2707	Computing professionals	14,875	42,100	23	65,575	89,600	6
2211	Electrical and electronic engineers	11,725	9,400	-4	29,875	26,600	-2
3201	Electrical and electronic engineering associates and technicians	12,325	11,900	-1	30,900	27,900	-2
4311	Communications equipment tradespersons	17,625	25,100	7	34,150	31,800	-1
4315	Office equipment and computer services	6,350	11,800	13	10,275	16,100	39
5201	Data processing machine operators	11,675	18,600	10	101,100	118,700	3
Total	IT Occupations	76,325	121,400	10	279,575	319,100	3
Total	**All Occupations**	**596,175**	**639,600**	1	**7,822,300**	**8,057,900**	1

Source: Houghton et al. 1996. p.106.

Key Developments in IT

Major trends affecting the information industries and shaping their development include:

- globalisation, the increasing interrelation of international trade, capital and technology flows;
- the changing composition of terms of trade, the increasing importance of manufactures to world trade, and changes in the relative prices of traded manufactures vis-a-vis commodities;
- the convergence of computing, communications and broadcasting into digital format;
- stronger regional growth than in the Australian domestic market;
- a shift in value in information and communication technology products from hardware to software and services (Information Industry Taskforce 1997: 4)

Contribution to the Economy: Growth, Exports and Imports of IT & T Products and Services

In terms of its contribution to the Australian economy the Australian information industry is very important. In 1995-96 the information industry market was estimated to be worth between A$55 billion and A$67 billion, depending on the breadth of industry definition. This represents 6.3-7.5% of national GDP (AIIA 1998a: 2). It is expected that this figure will continue to grow. While the demand

for IT products and services has grown dramatically over recent years, it is problematic that this demand has largely been met by imports. As a consequence the information industries account for 20-25 per cent of Australia's Elaborately Transformed Manufactures (ETMs) trade deficit (Information Industries Taskforce 1997). In 1995 the Australian trade deficit in IT&T was estimated at between A$7 and A$14 billion (depending on industry definition) and is projected to grow, if conditions remain unchanged, to A$22-46 billion by 2005. (AIIA 1998a: 3). While domestic demand may not be satisfied from local product, the information industries are amongst Australia's top export earners with exports exceeding $4 billion in 1995 alone (Information Industries Taskforce 1997).

An increased emphasis on the development of a local IT manufacturing industry would provide the basis on which a greater proportion of domestic demand could be met and exports could be increased. This is desirable not only because of the effect on the current account but also because as major producers of ETMs they are high growth industries which can provide the information infrastructure which increasingly underpins growth in other industries (Information Industries Taskforce 1997).

While the Australian domestic information industries market is growing at around 13 per cent per annum, nearly four times GDP growth, and has good long term growth prospects (Information Industries Taskforce 1997: p12), Australia's manufacturing base in this area is still not sufficient to meet domestic demand. With the world market dominated by a small number of large multinational companies it becomes increasingly difficult for Australian exporters to get a toehold into the industry on a significant scale. At present Australia's share of the international trade in IT&T is very low at 0.3% (AIIA 1998a: 3).

Table 15 shows that the growth in turnover in the information industries has been significantly higher than that experienced in the manufacturing industries over the period 1989-90 to 1995-96, with a compound annual growth rate of 11.6 per cent.

Table 15: Manufacturing Industries' Turnover 1989-90 to 1995-96 and Compound Annual Growth Rates

Industry	Turnover (A$ bn)		CAGR
	1989-90	*1995-96*	
Food, beverage and tobacco mfg	33.3	43.1	4.4
Textile, clothing and footwear mfg	9.9	9.8	-0.1
Wood and paper products mfg	9.5	11.4	3.1
Print, publish and record media mfg	10.4	13.7	4.6
Petroleum, coal and chemical mfg	26.2	30.1	2.3
Non-metallic mineral products mfg	8.1	8.6	0.9
Metal products	34.1	36.9	1.3
Information Industries	**19.5**	**33.7**	**11.6**

Source: Information Industries Taskforce 1997, p.24.

Training and Skills Development in IT&T

Industry representatives have consistently claimed that there are perennial skill shortages that plague the IT industry (Information Industries Taskforce 1997: 76). The skills shortage crisis in IT is not unique to Australia. Baxter claims that:

> *(at) the World Congress on information Technology in Fairfax County Virginia ... a consistent message from both delegates and speakers was that the availability of skilled professionals is one of the greatest threats to the IT & T industry (1998: 2).*

The AIIA estimates that the skilled vacancy level in Australia's IT&T industry is likely to be greater than ten per cent of total employment (Baxter 1988: 11). In the ten years to November 1998 the Skilled Vacancy Survey Index for computing professionals rose by 305 per cent compared to a rise of 15 per cent for all professionals (DCITA 1998: 4). A recent survey in Victoria showed that the high priority areas for the industry are:

- Internet, intranet and extranet specialists
- networking computing specialist
- web site development specialists
- security specialists
- protocols specialists
- help desk/client support personnel
- people who can design business applications
- people skilled in a variety of programming languages
- people to work on year 2000 compliance issues

At a lower level of priority, but still in strong demand were:

- multiskilled support personnel in technical/business sales
- project managers
- database managers
- data warehousing specialists
- businesses process re-engineering specialists (Baxter 1998: 6).

The areas of skill shortages show a bias towards the service sector. Unlike other service sector employment, however, these positions tend to be well paid, highly skilled and relatively secure (Baxter 1998).

Not all employees in the IT industry are IT professionals. Like other businesses the industry employs a range of support personnel such as human resource managers, trainers, sales staff etc. These areas are likely to suffer skills shortages as well if such a shortage exists more generally.

Yet in Australia there is a lack of information about the specific extent and location of the skills shortages (Baxter 1998: 3). The information that is available, such as the Skilled Vacancy Survey, shows that there has been a 19.4% increase in vacancies for computing professionals over the past 12 months and compared to a total of 13.6 per cent for other professional occupations (DEETYA 1998: 2).

Skill shortages in IT are apparently quite uneven, partly because of the volatility and fragmentation of the labour market, especially for computing professionals. Moreover, at the lower end of the labour market, amongst, for example, word processing and data processing workers, skill shortages are uncommon. A recent survey and discussion paper prepared jointly by four federal departments notes that while there is significant evidence of a shortage of some skills, there are oversupplies of other skills. It also notes that certain classes of workers tend to confront difficulties in gaining employment, in particular 'new graduates' and 'recent immigrants with poor English language skills' (DCITA 1998: 15).

According to that study employers are constantly seeking professionals with experience and expertise in a 'number of database systems and languages' and with strong 'communication and interpersonal skills'. This suggests the need for a greater emphasis in higher education and VET on the development of skills using a variety of applications and environments and on the so-called 'soft skills' as well as technical skills.

The Australian Information Industries Association has claimed that Australia currently confronts a shortage of 30,000 IT workers. The DCITA Discussion Paper cautions, however, that the IT labour market is characterised by particularly high turnover and that specific skill shortages may often be caused by that turnover. Problems in IT skills development are also exacerbated by the pace of product change and the consequential requirement for IT workers to constantly retrain. The propensity for IT employees to change jobs regularly has also been reported to operate as a disincentive to employers investing significantly in the training of their existing staff (DCITA 1998: 18).

While there is a strong industry consensus that the increasing demand for IT professionals, in particular, is bound to continue the volatility of the skills demands of the industry makes predicting the magnitude or areas of future demand especially hazardous. For example, many IT professionals are presently occupied on Y2K projects. It remains to be seen whether the labour market remains as buoyant as the volume of Y2K compliance work declines.

Demand for University Computer Science, Information Systems and Electronic and Computer Engineering courses has increased dramatically over the past decade. For example, enrolments in Computer Science and Information Systems courses have almost doubled from 6,629 in 1989 to 13,128 in 1997 (DCITA 1998: 21).

The dominance of private, vendor-provided or vendor-licensed training in the VET sector has been recognised by government to present difficulties for skills development. 'This can limit recognition and portability of skills across the industry and State boundaries, and can make it difficult for unemployed people, especially young people, to establish career paths in the industry' (DCITA 1998:22). The high cost of many of the courses also points to more general equity and access questions —the system of widespread industry deference to vendor-provided or vendor-licensed training may make required training inaccessible for more than just the young unemployed. While the level of industry recognition associated with the vendor training courses cannot be doubted, the means by which the quality and relevance of the courses can be guaranteed is also unclear.

The growth and present level of vendor training is virtually impossible to assess. There is no requirement (or particular reason) that these training courses necessarily result in nationally recognised Australian Qualification Framework (AQF) qualifications and they are therefore not necessarily included. Figures showing persons enrolled in VET in semi-professional computing courses, based on unpublished NCVER data, demonstrate some increase over the past few years. In 1997, 15,328 persons were enrolled in those advanced certificate, associate diploma and diploma courses (and their AQF equivalents, Certificate IV, Diploma and Advanced Diploma) compared to 12,728 in 1994. This 20 per cent increase in numbers is relatively modest alongside the 44 per cent increase in university enrolments for the same period.

In 1997 the Federal Government commissioned a report to establish an action agenda for the information industry. The Information Industries Taskforce (1997: 75) proposed three key recommendations with respect to enhancing the skills, education and training of those working in the information industries which can be summarised as follows:

1. Enhance tertiary information and communication technology education. In order to achieve the report called for the active involvement of government and industry to pursue the following goals:
   - Encourage partnerships (including staff exchanges) between industry and educational institutions at all levels to help ensure course relevance;
   - Focus TAFE and vocational training;
   - Create centres of excellence;

- Government should fund a redeemable vouchers system to provide 15,000 additional tertiary places in information and communication technology-related courses (including engineering) over the next three to five years;
- Encourage universities to integrate the various facets of information and communication technology disciplines more effectively;
- Encourage and provide greater support for the Cooperative Education Program and similar programs;
- Increase access to the technology. Students must have access to PCs and to the Internet. They are an essential instrument of education. To assist access government should allow students to add reasonable information and communication technology-related expenses to their HECS advance to enable them to 'buy now, pay later'. (Information Industries Taskforce 1997: 79-80).

2. Enhance information and communication technology education in schools. In order to achieve this governments must:
   - Ensure that school students have access to PCs and to the Internet from an early age.
   - Establish a national 'learning to use' initiative.
   - Establish a national 'using to learn' initiative.
   - Provide the opportunity to teach the teachers.
   - Implement an Information Management Education Program. (Information Industries Taskforce 1997: 80-81)
3. Enhance education in the workforce.

   To enable businesses to develop their skills base a multifaceted approach is required using existing and some new mechanisms to deliver better skilling outcomes for business.

   There are a number of things that should be done:
   - Enhance industry skills and retraining;
   - Enhance certification and professionalisation;
   - Give greater support to the Co-operative Multimedia Centre (CMC) initiative (Information Industries Taskforce 1997: 82-83).

The report envisaged a major role for government, especially in the enhancement of tertiary level and school level education, and it called for government-industry cooperation to improve the 'focus' of TAFE and other vocational training. Somewhat curiously, however, the report made no reference to TAFE or other VET institutions in its recommendation to enhance education in the workforce. While it referred to the need to use 'existing and some new mechanisms to deliver better skilling outcomes for business' (1997: 82) the report remained silent as to what mechanisms might be appropriate.

In 1998 the Department of Industry Science and Tourism's Information Industries and Online Taskforce reported on progress with the implementation of the action agenda. None of the initiatives noted there appeared to relate to the enhancement of skills formation, eduction and training for the sector and none of the key priorities for the future it identified related directly to training (Kuras 1998).

The government's four key departments in this area (the Department of Communications, Information Technology and the Arts, the Department of Education, Training and Youth Affairs, the Department of Employment, Workplace Relations and Small Business and the Department of Immigration and Multicultural Affairs) appear to be placing great stock in the capacity of the new IT Training Package to solve a number of current problems associated with IT VET. In particular the relevant departments have claimed that:

- Endorsement of the Training Package by Commonwealth, State and Territory Ministers 'ensures that the competencies gained by trainees are portable within the industry...'
- The introduction of the Training Packages 'is expected to facilitate a further increase in the supply of skilled and formally qualified people for this industry'.

- Part of the development of the IT Training Package involved working with 'Microsoft, Novell and Lotus to map and align major vendor training programs against the Package's qualifications' (Department of Communications, Information Technology and the Arts 1998: 23).
- The impact of the Training Package and its likely success in addressing these key issues are critical points of investigation taken up in the fieldwork analyses contained in the appendix to volume 1.

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